

TOSHIBA

FILE NO. 030-200107

SERVICE MANUAL

COLOUR TELEVISION

Z13B Chassis

28Z13B, 28Z13G

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SAFETY INSTRUCTIONS

WARNING: BEFORE SERVICING THIS CHASSIS, READ THE “X-RAY RADIATION PRECAUTION”, “SAFETY PRECAUTION” AND “PRODUCT SAFETY NOTICE” INSTRUCTIONS BELOW.

X-RAY RADIATION PRECAUTION

1. Excessive high voltage can produce potentially hazardous X-RAY RADIATION. To avoid such hazards, the high voltage must not be above the specified limit. The nominal value of the high voltage of this receiver is (A) kV at zero beam current (minimum brightness) under a (C) V AC power source. The high voltage must not, under any circumstances, exceed (B) kV.
2. The only source of X-RAY RADIATION in this TV receiver is the picture tube. For continued X-RAY RADIATION protection, the replacement tube must be exactly the same type tube as specified in the parts list.
3. Some part in this receiver have special safety-related characteristics for X-RAY RADIATION protection. For continued safety, parts replacement should be undertaken only after referring to the PRODUCT SAFETY NOTICE below.

Refer to table-1 for high voltage (A), (B) & AC voltage (C).
(See SETTING & ADJUSTING DATA on page 18)

Each time a receiver requires servicing, the high voltage should be checked following the HIGH VOLTAGE CHECK procedure in this manual. It is recommended that the reading of the high voltage be recorded as a part of the service record. It is important to use an accurate and reliable high voltage meter.

SAFETY PRECAUTION

WARNING : Service should not be attempted by anyone unfamiliar with the necessary precautions on this receiver. The following are the necessary precautions to be observed before servicing this chassis.

1. An isolation transformer should be connected in the power line between the receiver and the AC line before any service is performed on the receiver.
2. Always discharge the picture tube anode to the CRT conductive coating before handling the picture tube. The picture tube is highly evacuated and if broken, glass fragments will be violently expelled. Use shatter proof goggles and keep picture tube away from the unprotected body while handling.
3. When replacing a chassis in the cabinet, always be certain that all the protective devices are put back in place, such as; non-metallic control knobs, insulating covers, shields, isolation resistor-capacitor network etc.

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These characteristics are often passed unnoticed by a visual inspection and the protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this manual and its supplements; electrical components having such features are identified by the international hazard symbols on the schematic diagram and the parts list.

Before replacing any of these components, read the parts list in this manual carefully. The use of substitute replacement parts which do not have the same safety characteristics as specified in the parts list may create shock, fire, X-ray radiation or other hazards.

WARNING: BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION", "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" ON PAGE 3 OF THIS MANUAL.

SET-UP ADJUSTMENT

- The following adjustments should be made when a complete realignment is required or a new picture tube is installed. Perform the adjustments in order as follows :

1. Color Purity
2. Convergence
3. White Balance

Note: The PURITY/CONVERGENCE MAGNET assembly and rubber wedges need mechanical positioning.

Refer to figure 1.

Mounting position of the purity magnet assembly should fit to same position as old one because slightly difference to the position depend on a kind of tube.

- * There are no adjustment of purity and convergence in some picture tube (Unified with purity magnet)

COLOR PURITY ADJUSTMENT

NOTE : Before attempting any purity adjustments, the receiver should be operated for at least fifteen minutes.

1. Demagnetize the picture tube and cabinet using a degaussing coil.
2. Set the brightness and contrast to maximum.
3. Use a green raster from among the built-in test signals.
4. Loosen the clamp screw holding the yoke and slide the yoke backward or forward to provide vertical green belt (zone) in the picture screen.

5. Remove the Rubber Wedges.

6. Rotate and spread the tabs of the purity magnet (See figure 2.) around the neck of the picture tube until the green belt is in the center of the screen. At the same time, enter the raster vertically.

7. Slowly move the yoke forward or backward until a uniform green screen is obtained. Tighten the clamp screw of the yoke temporarily.

8. Check the purity of the red and blue raster.

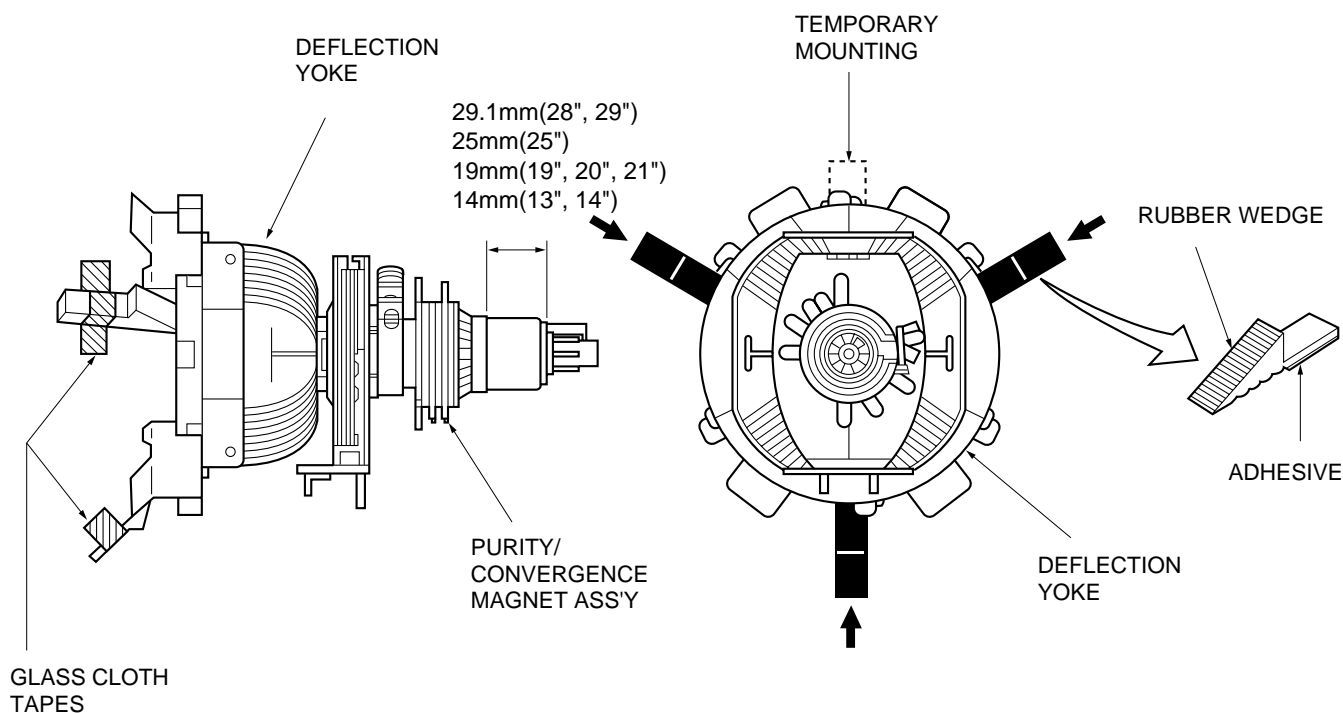


Figure 1.

CONVERGENCE ADJUSTMENTS

NOTE: Before attempting any convergence adjustments, the receiver should be operated for at least fifteen minutes.

■ CENTER CONVERGENCE ADJUSTMENT

1. Use the cross-dot pattern from among the built-in test signals.
2. Set the brightness and contrast for well defined pattern.
3. Adjust two tabs of the 4-Pole Magnets to change the angle between them (See figure 2.) and superimpose red and blue vertical lines in the center area of the picture screen.
4. Turn the both tabs at the same time keeping the angle constant to superimpose red and blue horizontal lines at the center of the screen.
5. Adjust two tabs of 6-Pole Magnets to superimpose red/blue line and green one. Adjusting the angle affects the vertical lines and rotating both magnets affects the horizontal lines.
6. Repeat adjustments 3, 4, 5 keeping in mind red, green and blue movement, because 4-Pole Magnets and 6-Pole Magnets have mutual interaction and make dot movement complex.

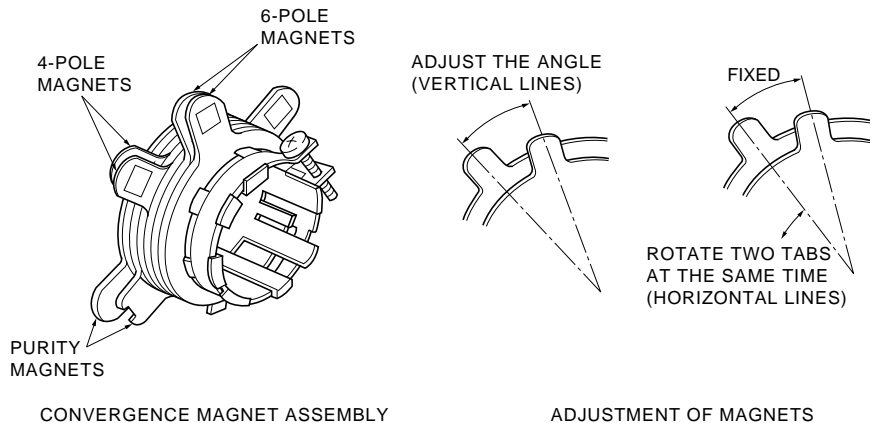
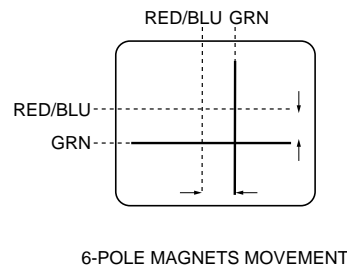
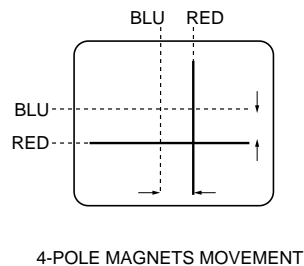
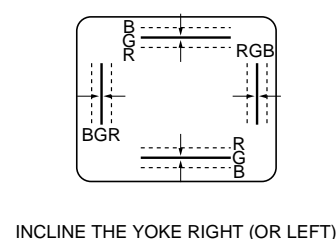
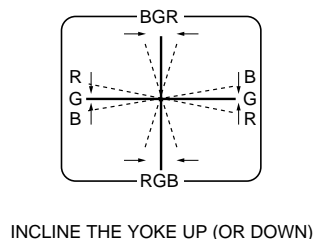


Figure 2.



Center Convergence by Convergence Magnets






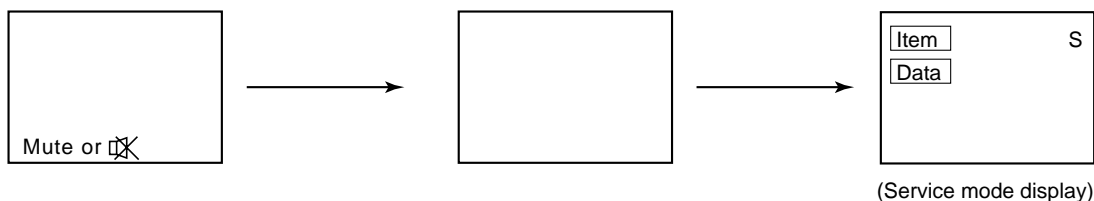
Circumference Convergence by DEF Yoke

Figure 3. Dot Movement Pattern

SERVICE MODE

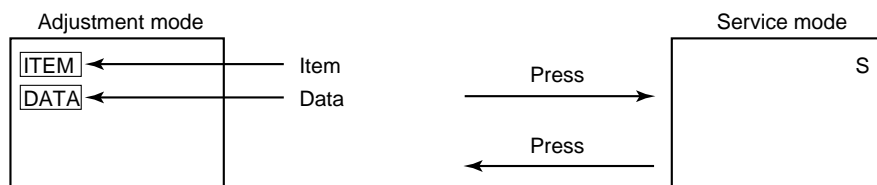
1. ENTERING TO SERVICE MODE

- 1) Press  button once on Remote Control.
- 2) Press  button again to keep pressing.
- 3) While pressing the  button, press MENU button on TV set.



2. DISPLAYING THE ADJUSTMENT MENU

- 1) Press MENU button on TV.



3. KEY FUNCTION IN THE SERVICE MODE

The following key entry during display of adjustment menu provides special functions.

A single horizontal line ON/OFF:

Test signal selection :

Selection of the adjustment items :

Change of the data value :

Adjustment menu mode ON/OFF :

Initialization of the memory (QA02) :

Reset the count of operating protect circuit to "00":

"RCUT" selection :

"GCUT" selection :

"BCUT" selection :


"CNTX" (or "SCNT") selection :


"COLC" selection :


"TNTC" selection :

Self diagnostic display ON/OFF :

INFO button (on Remote) or  button (on TV)

 button (on Remote)

Channel  (on TV or Remote)

Volume  +/- (on TV or Remote)

MENU button (on TV)

CALL + Channel button on TV ()

CALL + Channel button on TV ()

1 button

2 button

3 button

4 button

5 button - - - - Color thickness correction

6 button

9 button

note: Displayed differently as shown below, depending on the setting of the receiving color system.

COLP (PAL)

COLC (NTSC)

COLS (SECAM)

CAUTION : Never try to perform initialization unless you have changed the memory IC.

4. SELECTING THE ADJUSTING ITEMS

- 1) Every pressing of CHANNEL ▲ button in the service mode changes the adjustment items in the order of table-2.
(▼ button for reverse order)

Refer to table-2 for preset data of adjustment mode.
(See SETTING & ADJUSTING DATA on page 18)

5. ADJUSTING THE DATA

- 1) Pressing of VOLUME ▲ +/- button will change the value of data in the range from 00H to FFH. The variable range depends on the adjusting item.

6. EXIT FROM SERVICE MODE

- 1) Pressing POWER button to turn off the TV once.

■ INITIALIZATION OF MEMORY DATA OF QA02

After replacing QA02, the following initialization is required.

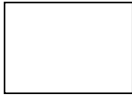
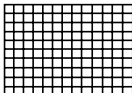
1. Enter the service mode, then select any register item.
2. Press and hold the CALL button on the Remote, then press the CHANNEL ▲ button on the TV. The initialization of QA02 has been completed.
3. Check the picture carefully. If necessary, adjust any adjustment item above.
Perform "Auto search Memory" on the owner's manual.

CAUTION: Never attempt to initialize the data unless QA02 has been replaced.

7. TEST SIGNAL SELECTION

- 1) Every pressing of -⊖ button on the Remote Control changes the built-in test patterns on screen as described below in SERVICE MODE.

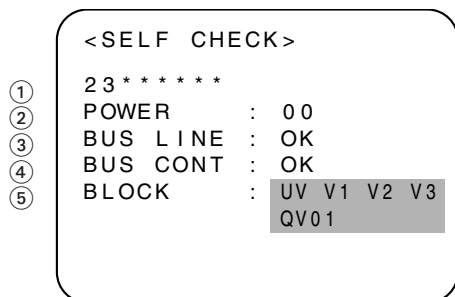
Signal off —→ NTSC signals (5 patterns)
 ↑ PAL signals (5 patterns) ←

Signals	Picture
<ul style="list-style-type: none"> • Red raster • Green raster • Blue raster • All White 	
<ul style="list-style-type: none"> • Black cross-hatch 	

* The signals marked with ■ are not usable to display in the Test signal for some model.

8. SELF DIAGNOSTIC FUNCTION

- 1) Press "9" button on Remote Control during display of adjustment menu in the service mode.
The diagnosis will begin to check if interface among IC's are executed properly.
- 2) During diagnosis, the following displays are shown.



- ① Part number of microcomputer (QA01)
- ② Operation number of protecting circuit ----"00" is normal.
When indication is other than "00", overcurrent appts to flow, and circuit parts may possibly be damaged.
- ③ BUS LINE CHECK ----"OK" is normal.
"SDA1-GND" ----- SDA-GND short circuit.
"SCL1-GND" ----- SCL-GND short circuit.
"SCL1-SDA1" ----- SCL-SDA short circuit.
- ④ BUS CONT ----"OK" is normal.
When indication shows "Q ○○○ NG", the device with the number may possibly be damaged.
- ⑤ BLOCK
UV : TV reception mode
V1 : VIDEO 1 input mode (→1)
V2 : VIDEO 2 input mode (→2)
V3 : VIDEO 3 input mode (→3)

Indicated color of mode now selected : Green and Red
Indicated color of other modes : White

Green : Normal

Red : The microcomputer operates to provide judgement of no video signal. The red color is still indicated though the signal is input, failure may exist in input signal line including QV01.

QV01 : In case of indication green ---Normal
In case of indication red with input signal---
Failure may exist in output line including QV01.


NOTE: Component which controls character display on screen is ICF01 (QT01) (TELETEXT IC.). If this display function fails to operate due to damage in ICF01 (QT01), self diagnosis procedure is as follows.

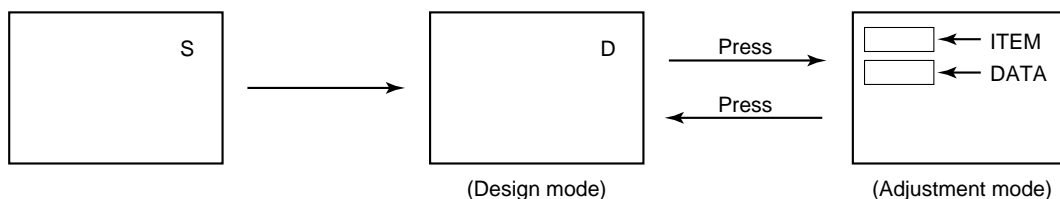
- (1) In case that power indicator is blinking with interval of 0.5 seconds; it means protecting circuit (Current limiter) is operating, and circuit components may possibly be damaged. Check related components.
- (2) In case that power indicator is blinking with interval of 1 second; Protecting circuit does not operate, but a part of Bus line does not operate normally. Check Bus line.

* The items marked with ■ are not usable to display in the SELF DIAGNOSTIC FUNCTION for some model.

DESIGN MODE

1. ENTERING TO DESIGN MODE

- 1) Select the Service mode.
- 2) While pressing  or CALL button on Remote and press MENU button on TV.
- 3) Press MENU button on TV.



When QA02 is initialized, items “OPT0”, “OPT1” and “OPT2” of DESIGN MODE are set to the data of the representative model of this chassis family.

Therefore, because ON-SCREEN specification remains in the state of the representative of model. This model is required to reset the data of items “OPT0”, “OPT1” and “OPT2”.

2. SELECTING THE ADJUSTING ITEMS

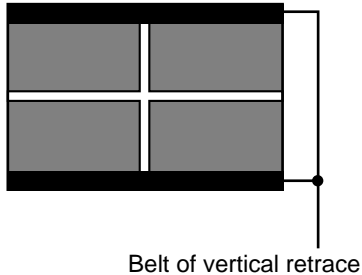
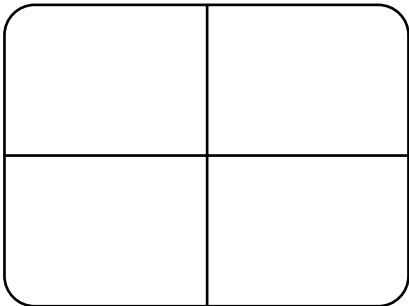
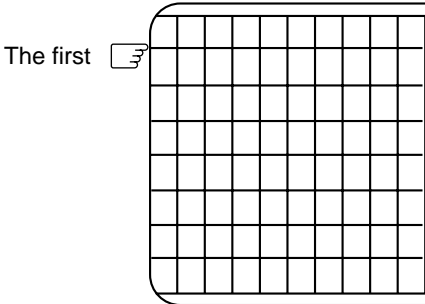
Every pressing of CHANNEL ▼ button in the design mode changes the adjustment items in the order of table-3. (▲ button for reverse order)


Refer to table-3 for data of design mode.
(See SETTING & ADJUSTING DATA on page 18)

3. ADJUSTING THE DATA

Pressing of VOLUME ▲ or ▼ button will change the value of data.

ELECTRICAL ADJUSTMENTS

ITEM	ADJUSTMENT PROCEDURE
FOCUS VR ADJ	<ol style="list-style-type: none"> 1. Enter the service mode, then select any register item. 2. Press the TV/VIDEO button on the Remote until the black cross-bar pattern appears on the screen. 3. Adjust the FOCUS control (on T461) for well defined scanning lines on the picture screen.
SUB-BRIGHTNESS (BRTC) Note: Constrict the picture height until the vertical retrace line appears adjusting the item HIT (HEIGHT).	<ol style="list-style-type: none"> 1. Set CONTRAST to minimum, and BRIGHTNESS to center by adjusting user controls. 2. Set the TV in service mode to get cross-bar of inside pattern. 3. Select BRTC (brightness correction), and adjust the \triangle - /+ button to reduce the value so that white portion of inside pattern slightly light. 4. Adjust \triangle - /+ button to increase the data value of BRTC, and set it just before the difference between the belt of vertical retrace and the border of black portion of inside pattern is visible. After that, return vertical height and contrast. 
HORIZONTAL POSITION ADJUSTMENT (HPOS) VERTICAL POSITION ADJUSTMENT (VPOS)	<ol style="list-style-type: none"> 1. Set the TV in service mode, and get black cross-bar signal with VIDEO button on remote hand unit. 2. Select either HPOS (Horizontal picture phase) or VPOS (Vertical picture phase) with CHANNEL \blacktriangle, \blacktriangledown buttons, and adjust horizontal or vertical picture position in the center of screen with VOLUME \triangle - /+ buttons. 
VERTICAL AMPLITUDE ADJUSTMENT (HIT)	<ol style="list-style-type: none"> 1. Set the TV in service mode, and get black cross-hatch signal with VIDEO button on remote hand unit. 2. Select HIT (Vertical amplitude) with CHANNEL \blacktriangle, \blacktriangledown buttons, and adjust vertical amplitude with VOLUME \triangle - /+ buttons so that vertical amplitude lacks a little. 3. Adjust vertical amplitude with VOLUME \triangle - /+ buttons so that the first bar on cross-hatch signal touches edge of screen. 

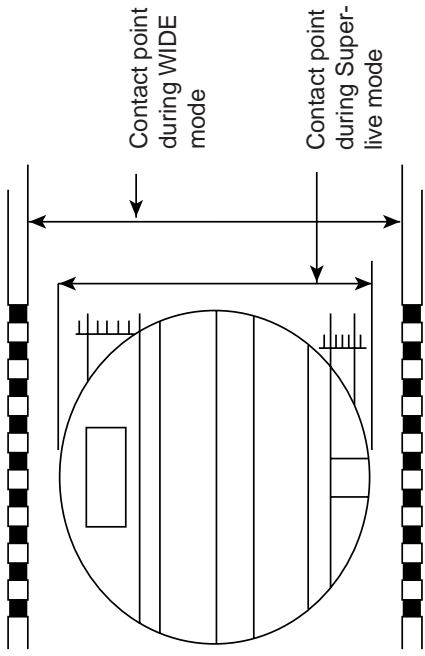
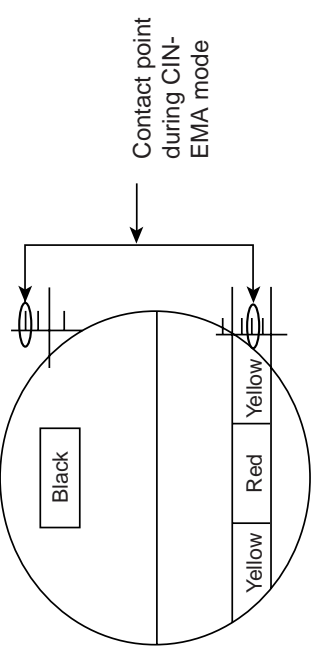
ITEM	ADJUSTMENT PROCEDURE
<p>WHITE BALANCE ADJUSTMENT</p> <ul style="list-style-type: none"> ● CUTOFF ADJUSTMENT (RCUT) (GCUT) (BCUT) ● DRIVE ADJUSTMENT (GDRV) (BDRV) 	<ol style="list-style-type: none"> 1. Set Contrast to 40, and brightness to +20 by picture control. 2. Receive the Black and White pattern. 3. Select RCUT, GCUT and BCUT with CHANNEL ▲, ▼ buttons, to set individual values to Initial reference data, and to set GDRV and BDRV to Initial reference data with VOLUME ▲ – /+ buttons (See page 18). 4. Press -/- - button on the remote control and rotate Screen VR to get one slight horizontal line on screen. Note: Every pressing of -/- - button provides Horizontal line picture and Normal picture alternately.  5. Press -/- - button to release horizontal line picture, and select the two other colors which did not light in the above step with CHANNEL ▲, ▼ buttons. Then tap VOLUME ▲ – /+ buttons so that three colors slightly light in the same level. <p>※ To correct white balance in light area, select GDRV and BDRV with CHANNEL ▲, ▼ buttons to adjust.</p> <p>※ To correct white balance in dark area, perform fine adjustment of RCUT, GCUT and BCUT.</p> <div data-bbox="1006 592 1409 892" style="border: 1px solid black; border-radius: 10px; padding: 10px; margin-top: 20px;"> <div data-bbox="1076 592 1344 678" style="border: 1px solid black; padding: 5px; text-align: center;">Light area check (to show white)</div> <div data-bbox="1122 821 1299 877" style="text-align: center;">Dark area check (to show black)</div> </div>

(Reference Factory Adjustments)

Items	Names	Settings	Input signals	Measuring points	Adjusting methods	Adjusting standards
VCO	VCO	N/A	NO need	Usual case OSD Check Rare case TP16 or Q501 #55 pin	Put set into Service mode Check OSD if it is "COIL OK". If OSD is "COIL NG" continue next action. Send AFT adj code by HHU command. With data displayed on screen press "0" on HHU (This is code 40 BF F6) Connect a volt-meter to pin 55 of the Q501. Then adjust the L161.	In case of "COIL OK" N/A IC Auto Adjust In case of "COIL NG" Voltage of pin 55 2.5±1V
AGC	AGC	N/A	CW@38.9 Mhz 0% modulation 100dBuV Level Factory Gen 206A Set polarity reverse Set system to WG	OSD Check	A) Open IF and AGC solder pads Apply input signal Put set into S mode Send AGC code 40 BF F7 Wait for OSD display to change to "AGC OK" B) or Feed-in the colour Bar Signal with sound (RF 90dBuV) Adjust AGC Bus data so as to get the good S/N picture and no inter modulation appearance	N/A IC Auto Adjust
BRTC	Sub-bright adjustment	Picture MODE-1	Sub-bright signal	Screen adjustment	1. This item shall be adjusted after the screen VR adjustment and white balance adjustment 2. Adjust the number of collapsed black lines of the sub-bright signal	32": 32Z13B/ 32Z13G 4±1.5 lines 28": 28Z13B/ 28Z13G 4±1.5 lines

Items	Names	Settings	Input signals	Measuring points	Adjusting methods	Adjusting standards
RCUT GCUT BCUT Screen VR GDRV BDRV	Screen adjustment and white balance adjustment (R cut off) (G cut off) (B cut off) (Screen)	RCUT: 40H GCUT: 40H BCUT: 40H GDRV: 40H BDRV: 40H Activated horizontal straight line mode (Local video key)		Screen adjust- ment	1. Set the conditions as shown left. 2. Gradually raise the screen brightness until either of R, G or B lines starts to gleam slightly. 3. Determine that point as the screen VR adjustment position. 4. Using RCUT, GCUT and BCUT, raise the brightness of two lines except the one that gleamed in step 2 until these lines start to gleam slightly (i.e. make the screen almost white). 5. Release the horizontal straight line mode (Local video key). 6. Using the white balance checker, repeat the adjustment steps until both bright and dark parts become correct value.	HIGH LIGHT (103 cd/m ²) 8750K-0.002uv DARK (17cd/m ²) 8750K-0.002uv * Adjustment range is the same as before
SRY SBY	Screen Black level adjust- ment. R-Y axis B-Y axis	Contrast: MAX Bright: Center Colour: Center	SECAM Colour bar	SRY: TP46R or Q501 #20pin SBY: TP46B or Q501 #22pin	1. Adjust the level of BW part of the colour difference signal to the level of HBLK part. 2. Adjust the R-Y axis and B-Y axis by SRY and SBY data items respectively.	0±10mV
SCNT	Sub-contrast	Picture MODE-1 Screen size: WIDE Audio system I	Sub-bright signal (PAL-I Signal)	TP46B or Q501 #22pin	1. Adjust the amplitude from the pedestal level to the white peak.	2.5±0.1Vp-p
COLP	Sub-colour center PAL	Picture MODE-1 Screen size: WIDE	Sub-bright signal (PAL)	TP46B or Q501 #22pin	1. Adjust the amplitude of B-Y. (Be sure to apply Y mute during adjustment)	32": 32Z13B/ 32Z13G 1.3±0.1 Vp-p 28": 28Z13B/ 28Z13G 1.3±0.1 Vp-p
COLS	Sub-colour center SECAM	Picture MODE-1 Screen size: WIDE	SECAM Colour bar	TP46B or Q501 #22pin	1. Adjust the amplitude of B-Y. (Be sure to apply Y mute during adjustment)	32": 32Z13B/ 32Z13G 1.7±0.1 Vp-p (Pedestal to Peak) 28": 28Z13B/ 28Z13G 1.7±0.1 Vp-p (Pedestal to Peak)

Data adjustment

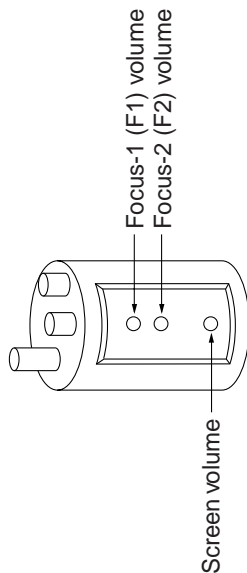
Adjusting items		Adjusting methods	
Vertical	WIDE mode Vertical amplitude [HIT]	PAL Philips Pattern, User adjustment standard Adjust the vertical amplitude by [HIT] so that both upper and lower flags will disappear from the screen.	
	Vertical position [VPS1]	PAL Philips Pattern, User adjustment standard Adjust the vertical position [VPS1] with Philips Pattern so that the vertical screen position will come to the center (see the right sketch) Note: Adjust and orient CPT either toward the south and north. If this is impossible, offset the difference.	
	SUPER LIVE mode Vertical amplitude [HIT]	PAL Philips Pattern, User adjustment standard Adjust the vertical amplitude by [HIT] so that the top and bottom of the circle will touch the CPT mask with Philips Pattern (see the right sketch).	
	CINEMA mode Vertical amplitude [HIT]	Phillips Pattern, User adjustment standard Adjust the vertical amplitude by [HIT] so that the points shown in the right bottom sketch will touch the CRT mask (see the right sketch).	

Data Adjustment

	Adjustment items	Adjustment methods
Horizontal	<p>WIDE mode</p> <p>Horizontal phase: [HPOS] Horizontal width: [WID] DPC correction: [PARA] Trapezoidal correction: [TRAP] DPC Corner correction: [CNR] Center wrap: [CPAR] DPC S correction: [HSC] Parallelogram correction: [CSAW]</p>	<p>Use PAL Philips.</p> <ol style="list-style-type: none"> 1. Use the [HPOS] for the horizontal screen position, and make adjustments so that the position will become a center. 2. Use the [WID] to fit the mask to the frames of left and right flags. 3. Use the [PARA] and [TRAP] and [TRAP] become optimum. 4. In case distortion adjustment is insufficient by the [PARA] [TRAP] adjustments , make adjustments by using the data of [CNR], [CPAR], [HSC] and [CSAW]. <ol style="list-style-type: none"> ① Decrease [CPAR] in case of the distortion shown in Fig. (a). On the contrary, increase [CPAR] in case of this distortion shown in Fig. (b). ② Decrease [CSAW] in case of the distortion shown in Fig. (c). On the contrary, increase [CSAW] in case of this distortion shown in Fig. (d). ③ Decrease [HSC] in case of the distortion shown in Fig. (e). On the contrary, increase [HSC] in case of this distortion shown in Fig. (f). <p>5. Re-adjust item (3) if need.</p>
	<p>SUPER LIVE mode</p> <p>Horizontal width: [WID] DPC correction: [PARA] Trapezoidal correction: [TRAP] DPC corner correction: [CNR] DPC S correction: [HSC] Parallelogram correction: [CSAW]</p>	<p>Use PAL Philips Pattern.</p> <p>How to adjust: same way as wide mode except [HPOS] and [CPRA]. [HPOS] and [CPRA] are NO adjust in SUPER LIVE mode.</p>
	<p>CINEMA mode</p> <p>Horizontal width: [WID] DPC correction: [PARA] Trapezoidal correction: [TRAP] DPC corner correction: [CNR] DPC S correction: [HSC] Parallelogram correction: [CSAW]</p>	<p>Use PAL Philips Pattern.</p> <p>How to adjust: same way as wide mode except [HPOS] and [CPRA]. [HPOS] and [CPRA] are NO adjust in CINEMA mode.</p>

Circuit adjustment (Volume/data adjustment)

Items	Adjustment items	Settings	Measuring points	Adjusting methods
FOCUS	Focus adjustment (1) Horizontal Focus Using F1 volume of T461 (FBT)	PAL Retoma signal WIDE mode	(1) refer to the Fig. 2	Set it at the position, where the screen center becomes optimum focus and most anticlockwise, using the focus volume (F1) of Fly-Back Transformer (T461).
	Focus adjustment (2) Vertical. Focus Using F2 volume of T461 (FBT)	PAL Retoma signal WIDE mode	(2) refer to the Fig. 2	Set it at the position, where the screen centre becomes optimum focus and most anticlockwise, using the focus volume (F2) of Fly-Back Transformer (T461).



CIRCUIT CHECK

HIGH VOLTAGE CHECK

CAUTION: There is no HIGH VOLTAGE ADJUSTMENT on this chassis. Checking should be done following the steps below.

1. Connect an accurate high voltage meter to the second anode of the picture tube.
2. Turn on the receiver. Set the BRIGHTNESS and CONTRAST controls to minimum (zero beam current).
3. High voltage must be measured below (B) kV.

Refer to table-1 for high voltage (B).
(See SETTING & ADJUSTING DATA on page 18)

4. Vary the BRIGHTNESS control to both extremes to be sure the high voltage does not exceed the limit under any conditions.

CHAPTER 2 SPECIFIC INFORMATIONS

SETTING & ADJUSTING DATA

【 SAFETY INSTRUCTIONS 】

		28"
HIGH VOLTAGE AT ZERO BEAM:	(A)	31.9 kV
MAX HIGH VOLTAGE:	(B)	34.0 kV
AC VOLTAGE	(C)	220~240 V

Table-1

【 SERVICE MODE 】

ADJUSTING ITEMS AND DATAS IN THE SERVICE MODE:

Item	Adjustment	Reference data	Item	Adjustment	Reference data
RCUT	R CUTOFF (B/W)	40H	VPOS1	V-POSITION (WIDE)	80H
GCUT	G CUTOFF (B/W)	40H	HIT	HEIGHT (WIDE)	34H
BCUT	B CUTOFF (B/W)	40H	VLIN	V-LINEARITY (WIDE)	13H
GDRV	R DRIVE	40H	WID	PICTURE WIDTH (WIDE)	34H
BDRV	B DRIVE	40H	PARA	E-W PARABOLA (WIDE)	12H
BRTC	SUB BRIGHT CEN	40H	CNR	E-W CORNER (WIDE)	18H
COLP	SUB COLOR CEN PAL	3CH	TRAP	TRAPEZIUM (WIDE)	3BH
COLS	SUB COLOR CEN SECAM	3CH	RAGC	RF AGC	27H
SCNT	SUB CONTRAST	07H	CSAW	CENTER SAW	06H
SRY	SECAM R-Y	08H	CPAR	CENT PARA	05H
SBY	SECAM B-Y	07H	HSC	E-W S CORR	10H
HPOS	H-POSITION (WIDE)	09H			

Table-2

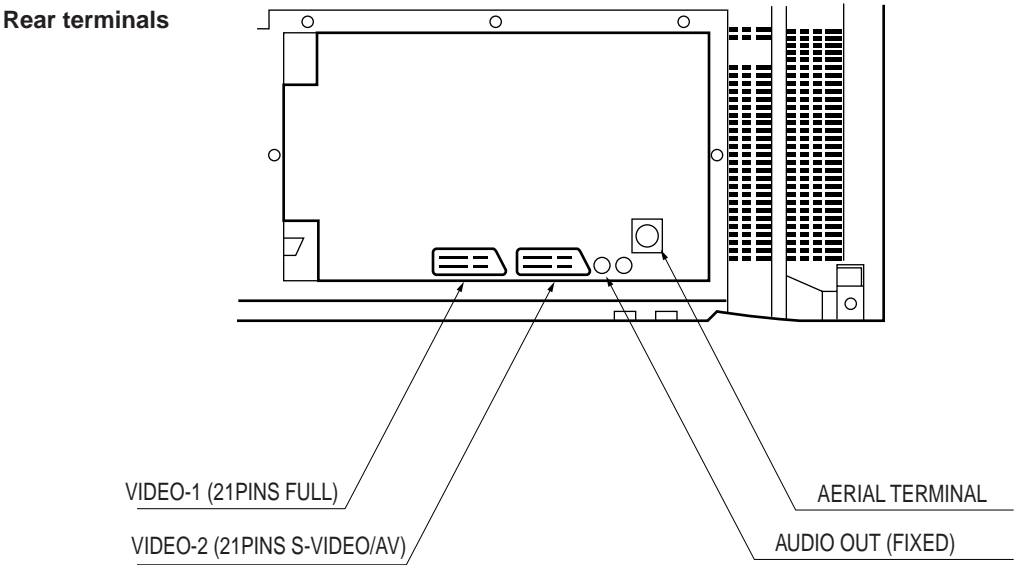
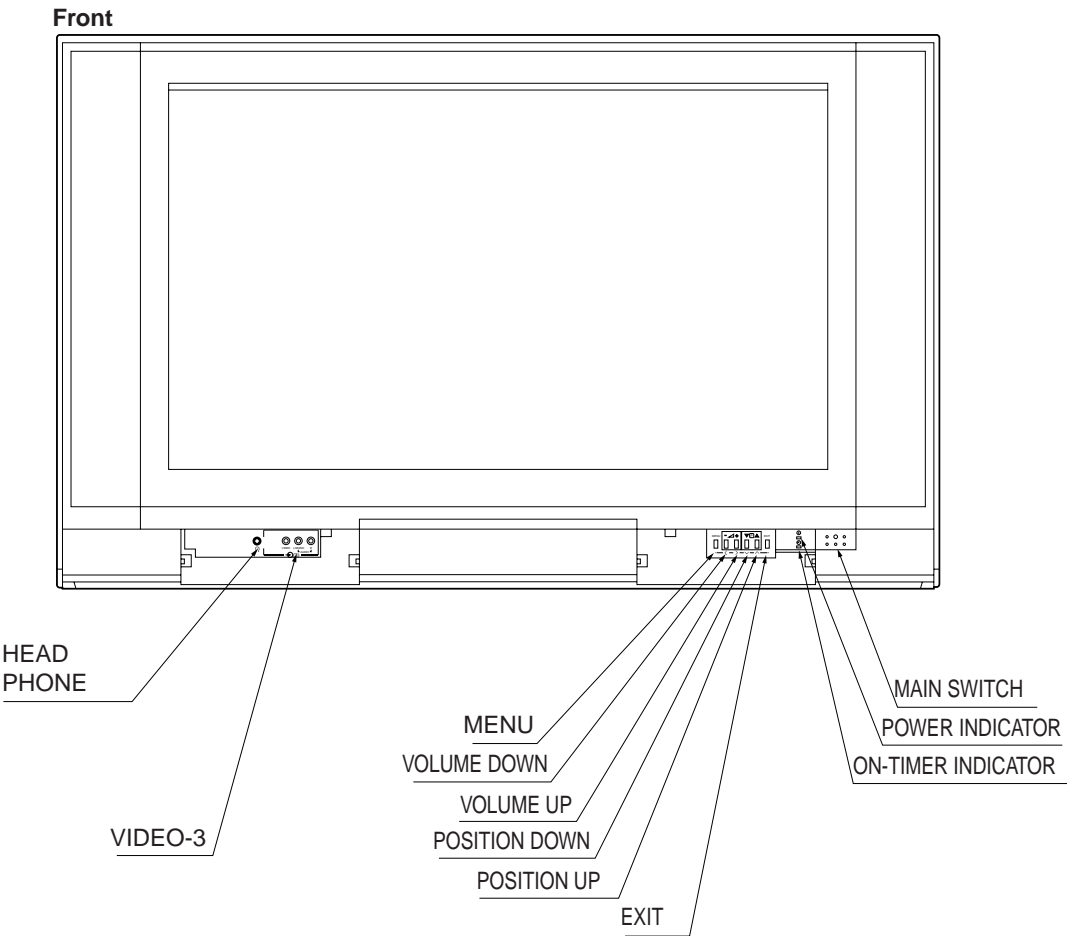
【 DESIGN MODE 】

ADJUSTING ITEMS AND DATAS IN THE DESIGN MODE:

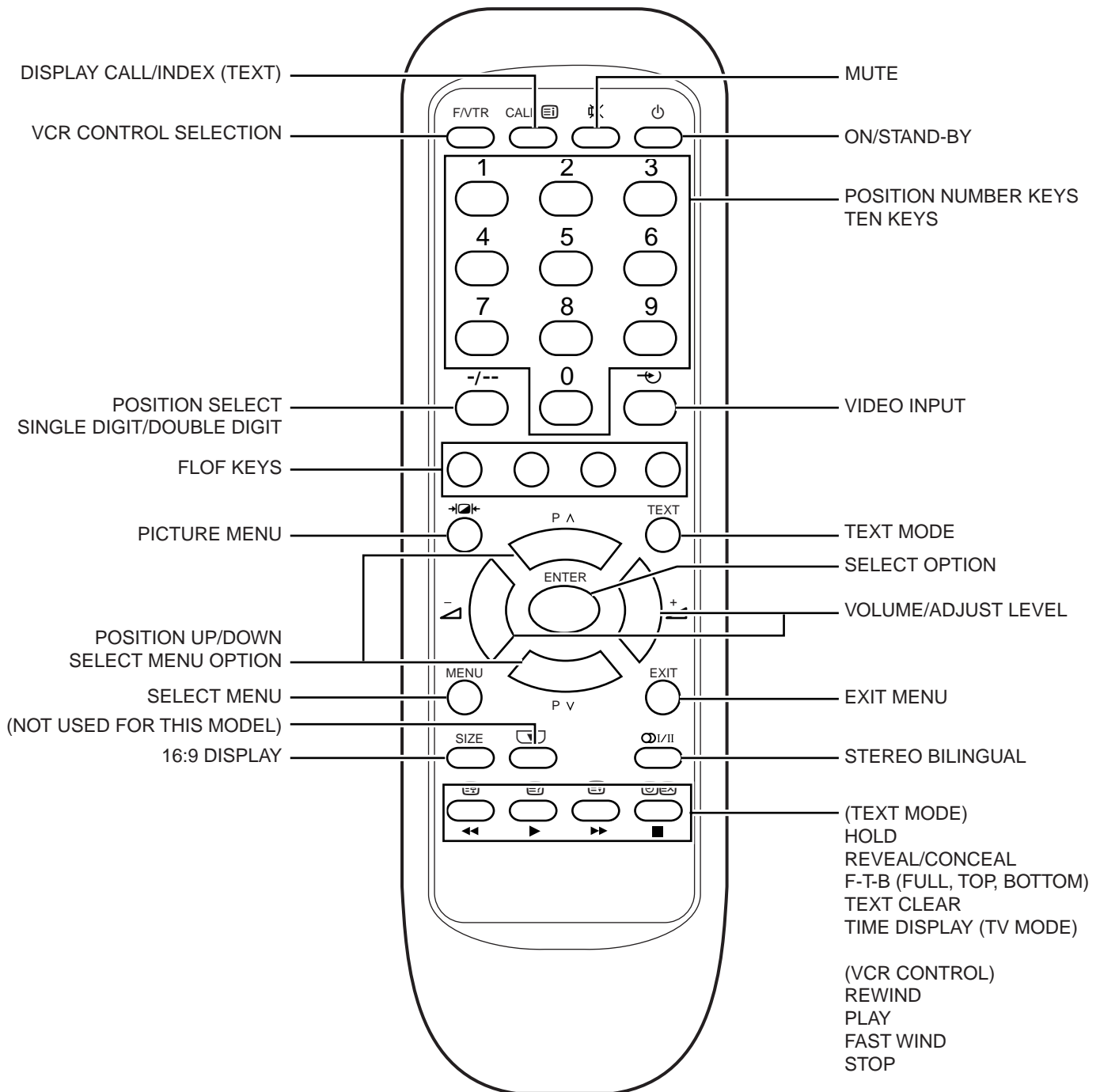
Item	Name of adjustment	Preset Data	Data	Remarks
	* There are no adjustments of the design mode.			

Table-3

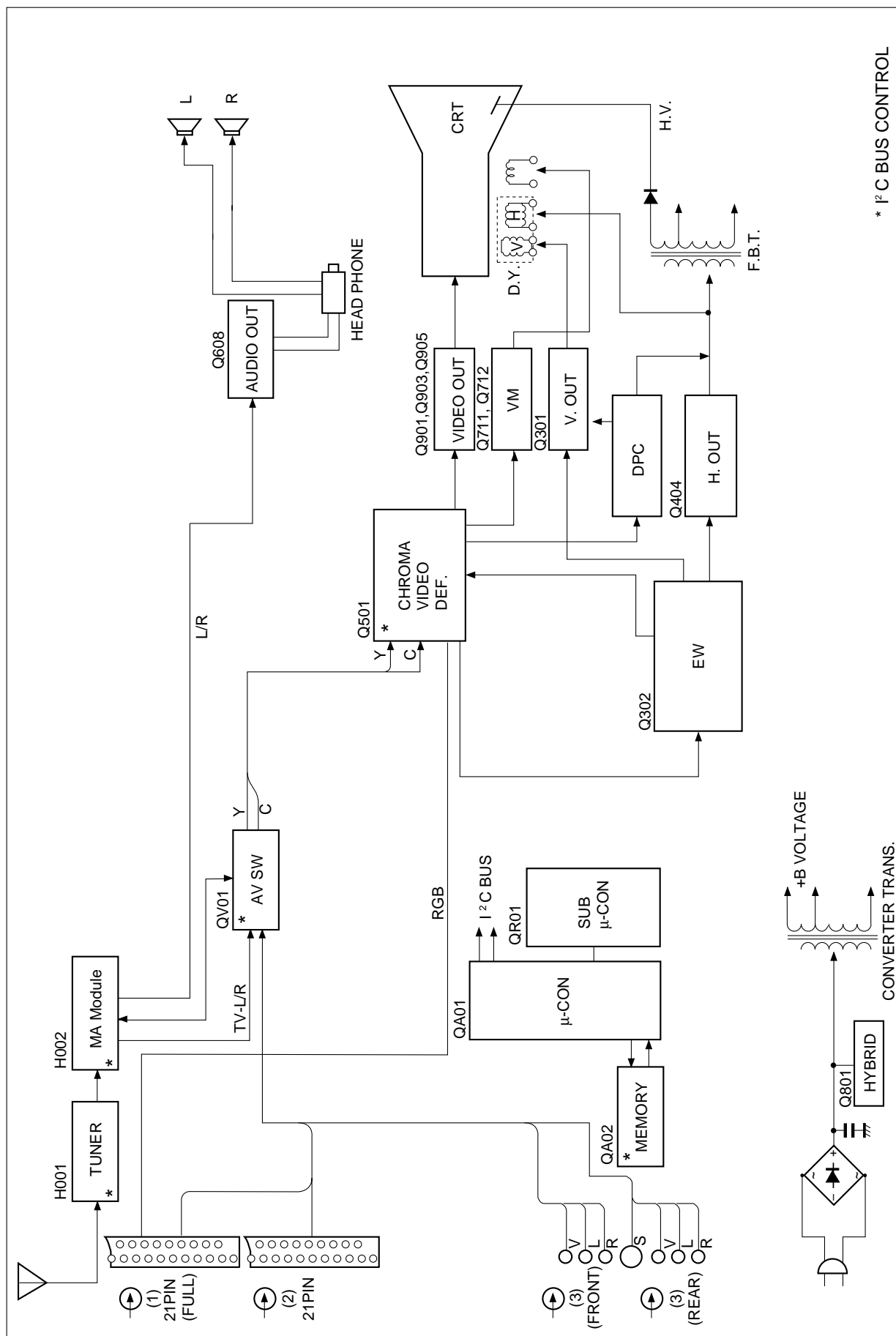
LOCATION OF CONTROLS



Remote Controller




CIRCUIT BLOCK DIAGRAM



* I²C BUS CONTROL

CHASSIS AND CABINET REPLACEMENT PARTS LIST

WARNING: BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION", "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" ON PAGE 3 OF THIS MANUAL.

CAUTION: The international hazard symbols "" in the schematic diagram and the parts list designate components which have special characteristics important for safety and should be replaced only with types identical to those in the original circuit or specified in the parts list. The mounting position of replacements is to be identical with originals. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE. Do not degrade the safety of the receiver through improper servicing.

NOTICE:

- The part number must be used when ordering parts, in order to assist in processing, be sure to include the Model number and Description.
- The PC board assembly with * mark is no longer available after the end of the production.

Models : 28Z13B, 28Z13G

Capacitors	CD :	Ceramic Disk	PF :	Plastic Film	EL :	Electrolytic
Resistors	CF :	Carbon Film	CC :	Carbon Composition	MF :	Metal Film
	OMF :	Oxide Metal Film	VR :	Variable Resistor	FR :	Fusible Resistor

(All CD and PF capacitors are $\pm 5\%$, 50V and all resistors, $\pm 5\%$, 1/6W unless otherwise noted.)

Location No.	Part No.	Description
CAPACITORS		
C103	24232103	CD, 0.01 μ F, +80%, -20%
C104	24232103	CD, 0.01 μ F, +80%, -20%
C107	24232103	CD, 0.01 μ F, +80%, -20%
C108	24232103	CD, 0.01 μ F, +80%, -20%
C109	24232103	CD, 0.01 μ F, +80%, -20%
C110	24232103	CD, 0.01 μ F, +80%, -20%
C112	24436150	CD, 15pF (28Z13G)
C113	24232103	CD, 0.01 μ F, +80%, -20%
		(28Z13G)
C114	24794470	EL, 47 μ F, $\pm 20\%$, 16V (28Z13G)
C114	24797229	EL, 2.2 μ F, $\pm 20\%$, 50V
		(28Z13B)
C115	24232103	CD, 0.01 μ F, +80%, -20%
C116	24503041	PF, 0.1 μ F, 63V
C117	24232103	CD, 0.01 μ F, +80%, -20%
C118	24794101	EL, 100 μ F, $\pm 20\%$, 16V
C121	24232103	CD, 0.01 μ F, +80%, -20%
C123	24794221	EL, 220 μ F, $\pm 20\%$, 16V
C124	24232103	CD, 0.01 μ F, +80%, -20%
C130	24436470	CD, 47pF (28Z13G)
C160	24794101	EL, 100 μ F, $\pm 20\%$, 16V
C161	24797478	EL, 0.47 μ F, $\pm 20\%$, 50V
C162	24212332	CD, 3300pF, $\pm 10\%$
C165	24794100	EL, 10 μ F, $\pm 20\%$, 16V
C166	24797010	EL, 1 μ F, $\pm 20\%$, 50V
C168	24794100	EL, 10 μ F, $\pm 20\%$, 16V
C169	24590103	PF, 0.01 μ F
C180	24797229	EL, 2.2 μ F, $\pm 20\%$, 50V
C181	24212102	CD, 1000pF, $\pm 10\%$
C183	24794101	EL, 100 μ F, $\pm 20\%$, 16V
C188	24794100	EL, 10 μ F, $\pm 20\%$, 16V
C189	24232103	CD, 0.01 μ F, +80%, -20%
C190	24232103	CD, 0.01 μ F, +80%, -20%
C199	24797100	EL, 10 μ F, $\pm 20\%$, 50V
C216	24797478	EL, 0.47 μ F, $\pm 20\%$, 50V
C221	24436100	CD, 10pF, ± 0.25 pF
C222	24436100	CD, 10pF, ± 0.25 pF
C223	24436100	CD, 10pF, ± 0.25 pF
C224	24794100	EL, 10 μ F, $\pm 20\%$, 16V
C225	24503041	PF, 0.1 μ F, 63V

Location No.	Part No.	Description
C226	24206108	EL, 0.1 μ F, $\pm 20\%$, 50V
C233	24797010	EL, 1 μ F, $\pm 20\%$, 50V
C302	24214471	CD, 470pF, $\pm 10\%$, 500V
C303	24214471	CD, 470pF, $\pm 10\%$, 500V
C305	24667222	EL, 2200 μ F, $\pm 20\%$, 25V
C308	24797221	EL, 220 μ F, $\pm 20\%$, 50V
C309	24591102	PF, 1000pF
C310	24795222	EL, 2200 μ F, $\pm 20\%$, 25V
C313	24082057	PF, 0.22 μ F, 100V
C316	24795471	EL, 470 μ F, $\pm 20\%$, 25V
C317	24214561	CD, 560pF, $\pm 10\%$, 500V
C318	24794471	EL, 470 μ F, $\pm 20\%$, 16V
C320	24795471	EL, 470 μ F, $\pm 20\%$, 25V
C320	24796479	EL, 4.7 μ F, $\pm 20\%$, 35V
C322	24617912	EL, 2.2 μ F, $\pm 10\%$, 50V
C325	24590223	PF, 0.022 μ F
C326	24797010	EL, 1 μ F, $\pm 20\%$, 50V
C327	24794471	EL, 470 μ F, $\pm 20\%$, 16V
C332	24212102	CD, 1000pF, $\pm 10\%$
C345	24591561	PF, 560pF
C366	24082049	PF, 0.047 μ F, 100V
C370	24794100	EL, 10 μ F, $\pm 20\%$, 16V
C371	24797100	EL, 10 μ F, $\pm 20\%$, 50V
C374	24797470	EL, 47 μ F, $\pm 20\%$, 50V
C375	24797470	EL, 47 μ F, $\pm 20\%$, 50V
C403	24590822	PF, 8200pF
C404	24797478	EL, 0.47 μ F, $\pm 20\%$, 50V
C410	24214471	CD, 470pF, $\pm 10\%$, 500V
C413	24214821	CD, 820pF, $\pm 10\%$, 500V
C416	24678010	EL, 1 μ F, $\pm 20\%$, 200V
C417	24214391	CD, 390pF, $\pm 10\%$, 500V
C420	24794101	EL, 100 μ F, $\pm 20\%$, 16V
C423	24829393	PF, 0.039 μ F, 400V
C431	24232103	CD, 0.01 μ F, +80%, -20%
C431	24232103	CD, 0.01 μ F, +80%, -20%
C432	24590103	PF, 0.01 μ F
C433	24794100	EL, 10 μ F, $\pm 20\%$, 16V
C434	24794222	EL, 2200 μ F, $\pm 20\%$, 16V
C435	24212102	CD, 1000pF, $\pm 10\%$
C440	24082961	PF, 8200pF, $\pm 3\%$, 1500V
C442	24082912	PF, 0.18 μ F, 315V

Location No.	Part No.	Description
C444	24082607	PF, 4300pF, $\pm 3\%$, 1800V
C445	24828473	PF, 0.047 μ F, 200V
C446	24679330	EL, 33 μ F, $\pm 20\%$, 250V
C447	24820682	PF, 0.0068 μ F, 630V
C448	24640908	EL, 33 μ F, $\pm 20\%$, 160V
C451	24503041	PF, 0.1 μ F, 63V
C460	24073092	EL, 330 μ F, $\pm 20\%$, 50V
C462	24794222	EL, 2200 μ F, $\pm 20\%$, 16V
C463	24212222	CD, 2200pF, $\pm 10\%$
C464	24640872	EL, 10 μ F, $\pm 20\%$, 100V
C466	24095879	PF, 0.022 μ F, $\pm 3\%$, 630V
C470	24794470	EL, 47 μ F, $\pm 20\%$, 16V
C471	24085988	EL, 1.0 μ F, $\pm 20\%$, 50V, Non-Polar
C473	24669010	EL, 1 μ F, $\pm 20\%$, 50V
C475	24820103	PF, 0.01 μ F, 630V
C476	24794220	EL, 22 μ F, $\pm 20\%$, 16V
C477	24503041	PF, 0.1 μ F, 63V
C479	24214471	CD, 470pF, $\pm 10\%$, 500V
C484	24590103	PF, 0.01 μ F
C495	24092343	CD, 680pF, $\pm 10\%$, 2kV
C496	24092343	CD, 680pF, $\pm 10\%$, 2kV
C510	24503041	PF, 0.1 μ F, 63V
C511	24503041	PF, 0.1 μ F, 63V
C512	24212222	CD, 2200pF, $\pm 10\%$
C516	24232103	CD, 0.01 μ F, +80%, -20%
C521	24503041	PF, 0.1 μ F, 63V
C522	24503041	PF, 0.1 μ F, 63V
C523	24503041	PF, 0.1 μ F, 63V
C524	24794101	EL, 100 μ F, $\pm 20\%$, 16V
C525	24590103	PF, 0.01 μ F
C526	24590222	PF, 2200pF
C527	24353090	CD, 9pF, ± 0.25 pF, CH
C528	24206228	EL, 0.22 μ F, $\pm 20\%$, 50V
C529	24794101	EL, 100 μ F, $\pm 20\%$, 16V
C560	24503041	PF, 0.1 μ F, 63V
C561	24503041	PF, 0.1 μ F, 63V
C562	24503041	PF, 0.1 μ F, 63V
C563	24503041	PF, 0.1 μ F, 63V
C564	24503041	PF, 0.1 μ F, 63V
C565	24503041	PF, 0.1 μ F, 63V
C567	24794100	EL, 10 μ F, $\pm 20\%$, 16V
C568	24232103	CD, 0.01 μ F, +80%, -20%
C569	24232103	CD, 0.01 μ F, +80%, -20%
C570	24232103	CD, 0.01 μ F, +80%, -20%
C571	24794100	EL, 10 μ F, $\pm 20\%$, 16V
C572	24794470	EL, 47 μ F, $\pm 20\%$, 16V
C573	24794100	EL, 10 μ F, $\pm 20\%$, 16V
C601	24797478	EL, 0.47 μ F, $\pm 20\%$, 50V
C603	24212102	CD, 1000pF, $\pm 10\%$
C612	24797100	EL, 10 μ F, $\pm 20\%$, 50V
C613	24797100	EL, 10 μ F, $\pm 20\%$, 50V
C621	24590103	PF, 0.01 μ F
C626	24797470	EL, 47 μ F, $\pm 20\%$, 50V
C636	24797100	EL, 10 μ F, $\pm 20\%$, 50V
C637	24667470	EL, 47 μ F, $\pm 20\%$, 25V
C638	24667470	EL, 47 μ F, $\pm 20\%$, 25V
C639	24796102	EL, 1000 μ F, $\pm 20\%$, 35V
C641	24795470	EL, 47 μ F, $\pm 20\%$, 25V
C642	24797100	EL, 10 μ F, $\pm 20\%$, 50V
C643	24797479	EL, 4.7 μ F, $\pm 20\%$, 50V
C644	24668102	EL, 1000 μ F, $\pm 20\%$, 35V
C645	24668102	EL, 1000 μ F, $\pm 20\%$, 35V
C647	24232103	CD, 0.01 μ F, +80%, -20%

Location No.	Part No.	Description
C648	24797479	EL, 4.7 μ F, $\pm 20\%$, 50V
C649	24797479	EL, 4.7 μ F, $\pm 20\%$, 50V
C669	24797330	EL, 33 μ F, $\pm 20\%$, 50V
C670	24797330	EL, 33 μ F, $\pm 20\%$, 50V
C674	24591561	PF, 560pF
C677	24591561	PF, 560pF
C696	24793101	EL, 100 μ F, $\pm 20\%$, 10V
C704	24591822	PF, 8200pF
C705	24797229	EL, 2.2 μ F, $\pm 20\%$, 50V
C707	24794470	EL, 47 μ F, $\pm 20\%$, 16V
C712	24794470	EL, 47 μ F, $\pm 20\%$, 16V
C713	24790100	EL, 10 μ F, $\pm 20\%$, 160V
C714	24436101	CD, 100pF
C715	24214472	CD, 4700pF, $\pm 10\%$, 500V
C716	24436101	CD, 100pF
C717	24214472	CD, 4700pF, $\pm 10\%$, 500V
C718	24794470	EL, 47 μ F, $\pm 20\%$, 16V
C719	24435151	CD, 150pF, 500V
C720	24790100	EL, 10 μ F, $\pm 20\%$, 160V
C721	24794470	EL, 47 μ F, $\pm 20\%$, 16V
△C801	24503055	PF, 0.22 μ F, $\pm 20\%$, 275V
△C802	24503055	PF, 0.22 μ F, $\pm 20\%$, 275V
C805	24092281	CD, 4700pF, $\pm 20\%$, AC250V
C806	24092281	CD, 4700pF, $\pm 20\%$, AC250V
C808	24667221	EL, 220 μ F, $\pm 20\%$, 25V
C810	24086037	EL, 270 μ F, $\pm 20\%$, 400V
△C813	24092555	CD, 1000pF, $\pm 20\%$, AC250V
△C814	24092555	CD, 1000pF, $\pm 20\%$, AC250V
C817	24092339	CD, 330pF, $\pm 10\%$, 2kV
C818	24095931	PF, 2200pF, 1250V
C819	24676220	EL, 22 μ F, $\pm 20\%$, 100V
C821	24214471	CD, 470pF, $\pm 10\%$, 500V
C823	24214471	CD, 470pF, $\pm 10\%$, 500V
C829	24590392	PF, 3900pF
C833	24669100	EL, 10 μ F, $\pm 20\%$, 50V
C841	24669100	EL, 10 μ F, $\pm 20\%$, 50V
C842	24669100	EL, 10 μ F, $\pm 20\%$, 50V
C843	24503041	PF, 0.1 μ F, 63V
C860	24794470	EL, 47 μ F, $\pm 20\%$, 16V
C884	24086916	EL, 330 μ F, $\pm 20\%$, 160V
C885	24214471	CD, 470pF, $\pm 10\%$, 500V
C887	24214471	CD, 470pF, $\pm 10\%$, 500V
C889	24669222	EL, 2200 μ F, $\pm 20\%$, 50V
C890	24667222	EL, 2200 μ F, $\pm 20\%$, 25V
C893	24092337	CD, 220pF, $\pm 10\%$, 2kV
C895	24676470	EL, 47 μ F, $\pm 20\%$, 100V
C896	24214471	CD, 470pF, $\pm 10\%$, 500V
C902	24092353	CD, 4700pF, $\pm 10\%$, 2kV
C904	24436561	CD, 560pF
C905	24436561	CD, 560pF
C907	24436561	CD, 560pF
C909	24679100	EL, 10 μ F, $\pm 20\%$, 250V
C910	24797478	EL, 0.47 μ F, $\pm 20\%$, 50V
C911	24794100	EL, 10 μ F, $\pm 20\%$, 16V
C912	24794102	EL, 1000 μ F, $\pm 20\%$, 16V
C913	24794100	EL, 10 μ F, $\pm 20\%$, 16V
C930	24214101	CD, 100pF, $\pm 10\%$, 500V
C931	24214101	CD, 100pF, $\pm 10\%$, 500V
C4401	24590103	PF, 0.01 μ F
C4402	24766010	EL, 1 μ F, $\pm 20\%$, 50V
C4403	24763331	EL, 330 μ F, $\pm 20\%$, 16V
C4404	24232103	CD, 0.01 μ F, +80%, -20%
CA01	24503041	PF, 0.1 μ F, 63V
CA02	24503041	PF, 0.1 μ F, 63V

Location No.	Part No.	Description
CA03	24503041	PF, 0.1 μ F, 63V
CA04	24232103	CD, 0.01 μ F, +80%, -20%
CA05	24212101	CD, 100pF, \pm 10%
CA06	24232103	CD, 0.01 μ F, +80%, -20%
CA07	24436560	CD, 56pF
CA08	24436560	CD, 56pF
CA09	24232103	CD, 0.01 μ F, +80%, -20%
CA10	24503041	PF, 0.1 μ F, 63V
CA11	24794100	EL, 10 μ F, \pm 20%, 16V
CA12	24794470	EL, 47 μ F, \pm 20%, 16V
CA13	24232103	CD, 0.01 μ F, +80%, -20%
CA14	24794100	EL, 10 μ F, \pm 20%, 16V
CA16	24794100	EL, 10 μ F, \pm 20%, 16V
CB01	24794470	EL, 47 μ F, \pm 20%, 16V
CB01	24797010	EL, 1 μ F, \pm 20%, 50V
CB02	24436181	CD, 180pF
CB02	24503041	PF, 0.1 μ F, 63V
CB03	24794330	EL, 33 μ F, \pm 20%, 16V
CB04	24212392	CD, 3900pF, \pm 10%
CB05	24212561	CD, 560pF, \pm 10%
CB30	24797100	EL, 10 μ F, \pm 20%, 50V
CB31	24232103	CD, 0.01 μ F, +80%, -20%
CB33	24212472	CD, 4700pF, \pm 10%
CB37	24436150	CD, 15pF
CB40	24232103	CD, 0.01 μ F, +80%, -20%
CB41	24232103	CD, 0.01 μ F, +80%, -20%
CB45	24232103	CD, 0.01 μ F, +80%, -20%
CB46	24797100	EL, 10 μ F, \pm 20%, 50V
CC01	24212102	CD, 1000pF, \pm 10%
CC01	24212332	CD, 3300pF, \pm 10%
CC02	24212102	CD, 1000pF, \pm 10%
CC02	24212332	CD, 3300pF, \pm 10%
CC03	24212152	CD, 1500pF, \pm 10%
CC04	24212152	CD, 1500pF, \pm 10%
CC05	24212102	CD, 1000pF, \pm 10%
CC05	24212152	CD, 1500pF, \pm 10%
CC06	24212102	CD, 1000pF, \pm 10%
CC06	24212152	CD, 1500pF, \pm 10%
CC07	24212102	CD, 1000pF, \pm 10%
CC08	24212102	CD, 1000pF, \pm 10%
CC09	24212471	CD, 470pF, \pm 10%
CC10	24212471	CD, 470pF, \pm 10%
CC11	24473330	CD, 33pF
CC13	24232103	CD, 0.01 μ F, +80%, -20%
CC14	24212102	CD, 1000pF, \pm 10%
CC15	24232103	CD, 0.01 μ F, +80%, -20%
CC16	24232103	CD, 0.01 μ F, +80%, -20%
CR01	24203100	EL, 10 μ F, \pm 20%, 16V
CR02	24797010	EL, 1 μ F, \pm 20%, 50V
CR03	24797010	EL, 1 μ F, \pm 20%, 50V
CR04	24797010	EL, 1 μ F, \pm 20%, 50V
CR05	24797010	EL, 1 μ F, \pm 20%, 50V
CR06	24797010	EL, 1 μ F, \pm 20%, 50V
CR07	24797010	EL, 1 μ F, \pm 20%, 50V
CR08	24353270	CD, 27pF, CH
CV02	24797010	EL, 1 μ F, \pm 20%, 50V
CV03	24797010	EL, 1 μ F, \pm 20%, 50V
CV04	24794100	EL, 10 μ F, \pm 20%, 16V
CV05	24797010	EL, 1 μ F, \pm 20%, 50V
CV06	24797010	EL, 1 μ F, \pm 20%, 50V
CV07	24794100	EL, 10 μ F, \pm 20%, 16V
CV08	24797010	EL, 1 μ F, \pm 20%, 50V
CV09	24794100	EL, 10 μ F, \pm 20%, 16V
CV10	24794100	EL, 10 μ F, \pm 20%, 16V

Location No.	Part No.	Description
CV11	24232103	CD, 0.01 μ F, +80%, -20%
CV12	24794100	EL, 10 μ F, \pm 20%, 16V
CV13	24797010	EL, 1 μ F, \pm 20%, 50V
CV15	24794100	EL, 10 μ F, \pm 20%, 16V
CV16	24232103	CD, 0.01 μ F, +80%, -20%
CV17	24794101	EL, 100 μ F, \pm 20%, 16V
CV24	24794101	EL, 100 μ F, \pm 20%, 16V
CV26	24797470	EL, 47 μ F, \pm 20%, 50V
CV31	24794220	EL, 22 μ F, \pm 20%, 16V
CV32	24794220	EL, 22 μ F, \pm 20%, 16V
CV36	24503041	PF, 0.1 μ F, 63V
CV38	24794101	EL, 100 μ F, \pm 20%, 16V
CV39	24794220	EL, 22 μ F, \pm 20%, 16V
CV40	24797478	EL, 0.47 μ F, \pm 20%, 50V
CV41	24794220	EL, 22 μ F, \pm 20%, 16V
CV54	24794220	EL, 22 μ F, \pm 20%, 16V
CV98	24212102	CD, 1000pF, \pm 10%

RESISTORS		
R101	24366271	CF, 270 ohm
R101	24553223	OMF, 22k ohm, 1W
R103	24366472	CF, 4700 ohm (28Z13G)
R104	24366472	CF, 4700 ohm (28Z13G)
R105	24366472	CF, 4700 ohm (28Z13G)
R106	24366360	CF, 36 ohm
R107	24366102	CF, 1k ohm
R108	24366562	CF, 5600 ohm
R110	24366681	CF, 680 ohm
R112	24366122	CF, 1200 ohm
R113	24366682	CF, 6800 ohm
R114	24366471	CF, 470 ohm
R115	24366360	CF, 36 ohm
R118	24366683	CF, 68k ohm
R119	24366133	CF, 13k ohm
R120	24366122	CF, 1200 ohm (28Z13G)
R121	24366512	CF, 5100 ohm (28Z13G)
R126	24366332	CF, 3300 ohm (28Z13G)
R127	24366102	CF, 1k ohm (28Z13G)
R128	24366182	CF, 1800 ohm
R129	24366101	CF, 100 ohm
R130	24366103	CF, 10k ohm (28Z13G)
R132	24366471	CF, 470 ohm
R133	24366221	CF, 220 ohm
R135	24366101	CF, 100 ohm
R136	24366102	CF, 1k ohm
R167	24366151	CF, 150 ohm
R168	24366684	CF, 680k ohm
R208	24366103	CF, 10k ohm
R209	24366103	CF, 10k ohm
R211	24366683	CF, 68k ohm
R216	24366824	CF, 820k ohm
R217	24366392	CF, 3900 ohm
R218	24366104	CF, 100k ohm
R219	24366393	CF, 39k ohm
R227	24366223	CF, 22k ohm
R228	24366271	CF, 270 ohm
R229	24366271	CF, 270 ohm
R230	24366271	CF, 270 ohm
R290	24552103	OMF, 10k ohm, 1/2W
R303	24321109	MF, 1 ohm, 1/2W
R305	24322828	MF, 0.82 ohm, 1W
R307	24366101	CF, 100 ohm
R308	24382471	OMF, 470 ohm, 1W
R312	24366223	CF, 22k ohm

Location No.	Part No.	Description
R314	24366102	CF, 1k ohm
R316	24366394	CF, 390k ohm
R318	24366101	CF, 100 ohm
R319	24366101	CF, 100 ohm
R320	24366155	CF, 1.5M ohm
R321	24366103	CF, 10k ohm
R322	24366102	CF, 1k ohm
R326	24339109	MF, 1 ohm, 2W
R327	24339109	MF, 1 ohm, 2W
R329	24366102	CF, 1k ohm
R330	24366103	CF, 10k ohm
R330	24366681	CF, 680 ohm
R331	24366104	CF, 100k ohm
R333	24552912	OMF, 9100 ohm, 1/2W
R335	24366153	CF, 15k ohm
R336	24383271	OMF, 270 ohm, 2W
R338	24552332	OMF, 3300 ohm, 1/2W
R341	24366822	CF, 8200 ohm
R343	24366153	CF, 15k ohm
R345	24366475	CF, 4.7M ohm
R370	24366822	CF, 8200 ohm
R371	24366103	CF, 10k ohm
R372	24552150	OMF, 15 ohm, 1/2W
R373	24366103	CF, 10k ohm
R373	24366103	CF, 10k ohm
R374	24366472	CF, 4700 ohm
R376	24366153	CF, 15k ohm
R400	24946561	CC, 560 ohm, 1/2W
R402	24366103	CF, 10k ohm
R403	24366822	CF, 8200 ohm
R405	24553682	OMF, 6800 ohm, 1W
R410	24366271	CF, 270 ohm
R411	24366103	CF, 10k ohm
R411	24366561	CF, 560 ohm
R412	24366332	CF, 3300 ohm
R413	24366103	CF, 10k ohm
R414	24366332	CF, 3300 ohm
R414	24531560	FR, 56 ohm, 1/2W
R415	24366103	CF, 10k ohm
R415	24553472	OMF, 4700 ohm, 1W
R416	24366223	CF, 22k ohm
R417	24366333	CF, 33k ohm
R417	24510432	Cement, 4300 ohm, 5W
R418	24366103	CF, 10k ohm
R419	24366103	CF, 10k ohm
R423	24366471	CF, 470 ohm
R424	24366152	CF, 1500 ohm
R425	24366182	CF, 1800 ohm
R426	24366751	CF, 750 ohm
R427	24366392	CF, 3900 ohm
R428	24366561	CF, 560 ohm
R429	24552560	OMF, 56 ohm, 1/2W
R430	24366223	CF, 22k ohm
R431	24366103	CF, 10k ohm
R431	24366223	CF, 22k ohm
R432	24366392	CF, 3900 ohm
R432	24366473	CF, 47k ohm
R433	24366103	CF, 10k ohm
R433	24366681	CF, 680 ohm
R434	24366271	CF, 270 ohm
R434	24366472	CF, 4700 ohm
R435	24366184	CF, 180k ohm
R436	24366153	CF, 15k ohm
R437	24366272	CF, 2700 ohm

Location No.	Part No.	Description
R438	24366103	CF, 10k ohm
R439	24366102	CF, 1k ohm
R441	24382222	OMF, 2200 ohm, 1W
R442	24366333	CF, 33k ohm
R442	24533151	FR, 150 ohm, 2W
R443	24366563	CF, 56k ohm
R444	24366563	CF, 56k ohm
R445	24321129	MF, 1.2 ohm, 1/2W
R445	24366563	CF, 56k ohm
R451	24366123	CF, 12k ohm
R452	24366682	CF, 6800 ohm
R460	24552332	OMF, 3300 ohm, 1/2W
R461	24552272	OMF, 2700 ohm, 1/2W
R462	24366114	CF, 110k ohm
R463	24323479	MF, 4.7 ohm, 2W
R464	24366273	CF, 27k ohm
R465	24366101	CF, 100 ohm
R466	24366562	CF, 5600 ohm
R467	24327224	MF, 220k ohm, $\pm 1\%$, 1/4W
R469	24000211	FR, 15 ohm, 1/2W
R470	24339568	MF, 0.56 ohm, 2W
R471	24531271	FR, 270 ohm, 1/2W
R472	24366101	CF, 100 ohm
R473	24366183	CF, 18k ohm
R474	24376393	CF, 39k ohm, 1/2W
R476	24366471	CF, 470 ohm
R477	24366102	CF, 1k ohm
R478	24381333	OMF, 33k ohm, 1/2W
R479	24531680	FR, 68 ohm, 1/2W
R480	24552222	OMF, 2200 ohm, 1/2W
R481	24366103	CF, 10k ohm
R481	24366223	CF, 22k ohm
R482	24366183	CF, 18k ohm
R482	24366684	CF, 680k ohm
R483	24366183	CF, 18k ohm
R484	24366223	CF, 22k ohm
R486	24366183	CF, 18k ohm
R487	24366474	CF, 470k ohm
R488	24366154	CF, 150k ohm
R489	24366102	CF, 1k ohm
R490	24366101	CF, 100 ohm
R491	24366101	CF, 100 ohm
R492	24366472	CF, 4700 ohm
R493	24366103	CF, 10k ohm
R494	24366103	CF, 10k ohm
R495	24366103	CF, 10k ohm
R499	24366101	CF, 100 ohm
R509	24366332	CF, 3300 ohm
R510	24366101	CF, 100 ohm
R511	24000527	MF, 5600 ohm, 1/4W
R512	24366682	CF, 6800 ohm
R513	24366102	CF, 1k ohm
R514	24366473	CF, 47k ohm
R515	24366103	CF, 10k ohm
R519	24366222	CF, 2200 ohm
R520	24366821	CF, 820 ohm
R521	24366102	CF, 1k ohm
R522	24366102	CF, 1k ohm
R523	24366333	CF, 33k ohm
R524	24366103	CF, 10k ohm
R525	24366392	CF, 3900 ohm
R526	24366101	CF, 100 ohm
R527	24366332	CF, 3300 ohm
R601	24366103	CF, 10k ohm

Location No.	Part No.	Description
R602	24366103	CF, 10k ohm
R603	24366103	CF, 10k ohm
R612	24366681	CF, 680 ohm
R613	24366681	CF, 680 ohm
R614	24366222	CF, 2200 ohm
R615	24366222	CF, 2200 ohm
R616	24366101	CF, 100 ohm
R617	24366101	CF, 100 ohm
R618	24366103	CF, 10k ohm
R619	24366103	CF, 10k ohm
R621	24366223	CF, 22k ohm
R622	24366223	CF, 22k ohm
R633	24366229	CF, 2.2 ohm
R634	24366229	CF, 2.2 ohm
R641	24366103	CF, 10k ohm
R645	24366102	CF, 1k ohm
R646	24366102	CF, 1k ohm
R661	24552221	OMF, 220 ohm, 1/2W
R662	24552221	OMF, 220 ohm, 1/2W
R668	24366103	CF, 10k ohm
R670	24366103	CF, 10k ohm
R673	24366123	CF, 12k ohm
R674	24366102	CF, 1k ohm
R675	24366123	CF, 12k ohm
R676	24366224	CF, 220k ohm
R681	24366103	CF, 10k ohm
R688	24366104	CF, 100k ohm
R689	24366103	CF, 10k ohm
R701	24366103	CF, 10k ohm
R702	24366101	CF, 100 ohm
R702	24552821	OMF, 820 ohm, 1/2W
R703	24366222	CF, 2200 ohm
R712	24366101	CF, 100 ohm
R715	24366223	CF, 22k ohm
R716	24366273	CF, 27k ohm
R717	24366333	CF, 33k ohm
R718	24366222	CF, 2200 ohm
R722	24552471	OMF, 470 ohm, 1/2W
R723	24366101	CF, 100 ohm
R724	24366221	CF, 220 ohm
R725	24366182	CF, 1800 ohm
R730	24552100	OMF, 10 ohm, 1/2W
R731	24553331	OMF, 330 ohm, 1W
R732	24366820	CF, 82 ohm
R733	24366683	CF, 68k ohm
R734	24366820	CF, 82 ohm
R735	24366683	CF, 68k ohm
R736	24366560	CF, 56 ohm
R737	24366152	CF, 1500 ohm
R738	24366102	CF, 1k ohm
R739	24366152	CF, 1500 ohm
R740	24366560	CF, 56 ohm
R741	24366279	CF, 2.7 ohm
R742	24366279	CF, 2.7 ohm
R743	24554221	OMF, 220 ohm, 2W
R744	24366122	CF, 1200 ohm
R745	24366122	CF, 1200 ohm
△ R801	24009954	Metal-Glazed Resistor, 2.2M ohm, 1/2W
R805	24366681	CF, 680 ohm
△ R808	24019484	PTC Thermistor, 4.5 ohm
R814	24366682	CF, 6800 ohm
R815	24366332	CF, 3300 ohm
R818	24019461	MF, 0.15 ohm, 2W

Location No.	Part No.	Description
R819	24310829	MF, 8.2 ohm, 1/2W
R821	24366101	CF, 100 ohm
R822	24552103	OMF, 10k ohm, 1/2W
R823	24552822	OMF, 8200 ohm, 1/2W
R827	24366681	CF, 680 ohm
R828	24366821	CF, 820 ohm
R829	24321159	MF, 1.5 ohm, 1/2W
R841	24531120	FR, 12 ohm, 1/2W
R842	24552392	OMF, 3900 ohm, 1/2W
R843	24366331	CF, 330 ohm
R846	24366101	CF, 100 ohm
R847	24366472	CF, 4700 ohm
R850	24366103	CF, 10k ohm
R851	24366471	CF, 470 ohm
R852	24366225	CF, 2.2M ohm
R860	24366681	CF, 680 ohm
R865	24366332	CF, 3300 ohm
R868	24366472	CF, 4700 ohm
△ R899	24005015	Metal-Glazed Resistor, 8.2M ohm, 1W
R901	24376471	CF, 470 ohm, 1/2W
R902	24376471	CF, 470 ohm, 1/2W
R903	24376471	CF, 470 ohm, 1/2W
R904	24366472	CF, 4700 ohm
R905	24366150	CF, 15 ohm
R914	24366471	CF, 470 ohm
R915	24366221	CF, 220 ohm
R916	24366221	CF, 220 ohm
R917	24366681	CF, 680 ohm
R918	24366470	CF, 47 ohm
R920	24000940	FR, 2 ohm, 2W
R921	24366471	CF, 470 ohm
R922	24366221	CF, 220 ohm
R924	24366470	CF, 47 ohm
R925	24366681	CF, 680 ohm
R928	24366471	CF, 470 ohm
R929	24366221	CF, 220 ohm
R930	24366470	CF, 47 ohm
R932	24366102	CF, 1k ohm
R933	24366750	CF, 75 ohm
R934	24366221	CF, 220 ohm
R935	24366102	CF, 1k ohm
R936	24366750	CF, 75 ohm
R937	24366681	CF, 680 ohm
R945	24366221	CF, 220 ohm
R946	24366221	CF, 220 ohm
R960	24383153	OMF, 15k ohm, 2W
R963	24383153	OMF, 15k ohm, 2W
R966	24383153	OMF, 15k ohm, 2W
R977	24366102	CF, 1k ohm
R992	24366150	CF, 15 ohm
R4310	24366183	CF, 18k ohm
R4408	24366361	CF, 360 ohm
R4411	24366103	CF, 10k ohm
R4412	24366153	CF, 15k ohm
R4430	24366752	CF, 7500 ohm
R4473	24366101	CF, 100 ohm
R4474	24366101	CF, 100 ohm
R4490	24382222	OMF, 2200 ohm, 1W
R4491	24366392	CF, 3900 ohm
R4492	24366103	CF, 10k ohm
R4493	24382104	OMF, 100k ohm, 1W
R4495	24366473	CF, 47k ohm
RA01	24366102	CF, 1k ohm

Location No.	Part No.	Description
RA02	24366102	CF, 1k ohm
RA03	24366102	CF, 1k ohm
RA04	24366102	CF, 1k ohm
RA05	24366103	CF, 10k ohm
RA06	24366102	CF, 1k ohm
RA07	24366103	CF, 10k ohm
RA08	24366102	CF, 1k ohm
RA09	24366102	CF, 1k ohm
RA10	24366103	CF, 10k ohm
RA11	24366103	CF, 10k ohm
RA12	24366331	CF, 330 ohm
RA13	24366102	CF, 1k ohm
RA14	24366331	CF, 330 ohm
RA15	24366103	CF, 10k ohm
RA16	24366331	CF, 330 ohm
RA17	24366102	CF, 1k ohm
RA18	24366273	CF, 27k ohm
RA19	24366102	CF, 1k ohm
RA20	24366103	CF, 10k ohm (28Z13G)
RA21	24366103	CF, 10k ohm (28Z13G)
RA22	24366472	CF, 4700 ohm (28Z13G)
RA25	24366101	CF, 100 ohm
RA26	24366471	CF, 470 ohm
RA27	24366102	CF, 1k ohm
RA28	24366102	CF, 1k ohm
RA29	24366151	CF, 150 ohm
RA30	24366103	CF, 10k ohm
RA31	24366102	CF, 1k ohm
RA32	24366331	CF, 330 ohm
RA33	24366472	CF, 4700 ohm
RA34	24366331	CF, 330 ohm
RA35	24366472	CF, 4700 ohm
RA36	24366472	CF, 4700 ohm
RA37	24366471	CF, 470 ohm
RA38	24366472	CF, 4700 ohm
RA39	24366102	CF, 1k ohm
RA41	24366103	CF, 10k ohm
RA42	24366103	CF, 10k ohm
RA45	24366101	CF, 100 ohm
RA46	24366101	CF, 100 ohm
RA47	24366101	CF, 100 ohm
RA48	24366101	CF, 100 ohm
RA49	24366101	CF, 100 ohm
RA50	24366102	CF, 1k ohm
RA71	24366113	CF, 11k ohm
RA72	24366512	CF, 5100 ohm
RA73	24366272	CF, 2700 ohm
RB01	24366182	CF, 1800 ohm
RB01	24366271	CF, 270 ohm
RB02	24366161	CF, 160 ohm
RB02	24366474	CF, 470k ohm
RB03	24366333	CF, 33k ohm
RB04	24366123	CF, 12k ohm
RB05	24366392	CF, 3900 ohm
RB06	24366392	CF, 3900 ohm
RB07	24366223	CF, 22k ohm
RB08	24366471	CF, 470 ohm
RB09	24366103	CF, 10k ohm
RB09	24366470	CF, 47 ohm
RB30	24366103	CF, 10k ohm
RB30	24366105	CF, 1M ohm
RB31	24366102	CF, 1k ohm
RB32	24366332	CF, 3300 ohm
RB33	24366332	CF, 3300 ohm

Location No.	Part No.	Description
RB35	24366102	CF, 1k ohm
RB36	24366102	CF, 1k ohm
RB37	24366221	CF, 220 ohm
RB38	24366331	CF, 330 ohm
RB39	24366331	CF, 330 ohm
RB50	24366101	CF, 100 ohm
RB51	24366472	CF, 4700 ohm
RC01	24366681	CF, 680 ohm
RC02	24366681	CF, 680 ohm
RC07	24366681	CF, 680 ohm
RC08	24366681	CF, 680 ohm
RF01	24366102	CF, 1k ohm
RF02	24366102	CF, 1k ohm
RF03	24366102	CF, 1k ohm
RR02	24366472	CF, 4700 ohm
RR03	24366103	CF, 10k ohm
RR04	24366333	CF, 33k ohm
RR05	24366103	CF, 10k ohm
RR06	24366182	CF, 1800 ohm
RR10	24366101	CF, 100 ohm
RR11	24366101	CF, 100 ohm
RR12	24366101	CF, 100 ohm
RR13	24366151	CF, 150 ohm
RR14	24366151	CF, 150 ohm
RR15	24366151	CF, 150 ohm
RV01	24366101	CF, 100 ohm
RV02	24366101	CF, 100 ohm
RV04	24366472	CF, 4700 ohm
RV05	24366472	CF, 4700 ohm
RV07	24366472	CF, 4700 ohm
RV09	24366472	CF, 4700 ohm
RV12	24366101	CF, 100 ohm
RV13	24366101	CF, 100 ohm
RV15	24366472	CF, 4700 ohm
RV16	24366472	CF, 4700 ohm
RV17	24366102	CF, 1k ohm
RV18	24366472	CF, 4700 ohm
RV19	24366222	CF, 2200 ohm
RV20	24366104	CF, 100k ohm
RV21	24366104	CF, 100k ohm
RV22	24366223	CF, 22k ohm
RV23	24366822	CF, 8200 ohm
RV24	24366750	CF, 75 ohm
RV25	24366222	CF, 2200 ohm
RV26	24366750	CF, 75 ohm
RV27	24366750	CF, 75 ohm
RV28	24552101	OMF, 100 ohm, 1/2W
RV29	24366102	CF, 1k ohm
RV30	24366101	CF, 100 ohm
RV31	24366102	CF, 1k ohm
RV32	24366102	CF, 1k ohm
RV33	24366102	CF, 1k ohm
RV34	24366104	CF, 100k ohm
RV35	24366104	CF, 100k ohm
RV36	24366104	CF, 100k ohm
RV37	24366104	CF, 100k ohm
RV38	24366750	CF, 75 ohm
RV39	24366750	CF, 75 ohm
RV40	24366822	CF, 8200 ohm
RV41	24366223	CF, 22k ohm
RV42	24366103	CF, 10k ohm
RV43	24366103	CF, 10k ohm
RV45	24366750	CF, 75 ohm
RV46	24366750	CF, 75 ohm

Location No.	Part No.	Description
RV48	24366750	CF, 75 ohm
RV49	24366750	CF, 75 ohm
RV53	24366102	CF, 1k ohm
RV54	24366222	CF, 2200 ohm
RV55	24366102	CF, 1k ohm
RV57	24552101	OMF, 100 ohm, 1/2W
RV58	24366101	CF, 100 ohm
RV59	24366102	CF, 1k ohm
RV60	24366561	CF, 560 ohm
RV61	24366561	CF, 560 ohm
RV62	24366103	CF, 10k ohm
RV63	24366103	CF, 10k ohm
RV64	24366103	CF, 10k ohm
RV80	24366681	CF, 680 ohm
RV83	24366681	CF, 680 ohm
RV99	24366750	CF, 75 ohm
RW01	24366681	CF, 680 ohm
RW02	24366681	CF, 680 ohm
COILS & TRANSFORMERS		
L101	23238562	Coil, Peaking, TRF4109AJ
L103	23238554	Coil, Peaking, TRF4R22AJ
L104	23221803	Coil, Choke, TLN3040D
L110	23289846	Coil, Peaking, TRF4101AT
L114	23289836	Coil, Peaking, TRF42R2AT
L130	23289841	Coil, Peaking, TRF4150AT (28Z13G)
L134	23289840	Coil, Peaking, TRF4100AT
L161	23262298	Coil, IF, TRF1245AV (28Z13G)
L161	23262300	Coil, IF, TRF1246AV (28Z13B)
L183	23289120	Coil, Peaking, TRF4120AF
L301	23103859	Coil (Ferrite Bead), TEM2011
L302	23289846	Coil, Peaking, TRF4101AT
L410	23103859	Coil (Ferrite Bead), TEM2011
L442	23248122	Coil, Choke, TLN3384D
L445	23221684	Coil, Choke, TLN3191D
L449	23103859	Coil (Ferrite Bead), TEM2011
L461	23248115	Coil, Choke, TLN3367D
L492	23222655	Coil, Width, TLN2074
L511	23289840	Coil, Peaking, TRF4100AT
L512	23289840	Coil, Peaking, TRF4100AT
L513	23289840	Coil, Peaking, TRF4100AT
L525	23289840	Coil, Peaking, TRF4100AT
L701	23289840	Coil, Peaking, TRF4100AT
L702	23261974	Coil, Choke, HC5-035
L704	23103859	Coil (Ferrite Bead), TEM2011
L705	23103859	Coil (Ferrite Bead), TEM2011
L811	23103859	Coil (Ferrite Bead), TEM2011
L860	23289836	Coil, Peaking, TRF42R2AT
L883	23221747	Coil, Choke, TRF9253D
L885	23248073	Coil, Choke, TLN3299D
L886	23103859	Coil (Ferrite Bead), TEM2011
L889	23280016	Coil, Peaking, TRF4100AZ
L892	23103859	Coil (Ferrite Bead), TEM2011
L893	23280016	Coil, Peaking, TRF4100AZ
L894	23289840	Coil, Peaking, TRF4100AT
L896	23103859	Coil (Ferrite Bead), TEM2011
△ L901	23200408	Coil, Degaussing, TSB-2397AM
L908	23289840	Coil, Peaking, TRF4100AT
L911	23289846	Coil, Peaking, TRF4101AT
LA02	23103859	Coil (Ferrite Bead), TEM2011
LA03	23289834	Coil, Peaking, TRF41R0AT
LA04	23103859	Coil (Ferrite Bead), TEM2011

Location No.	Part No.	Description
LA39	23103859	Coil (Ferrite Bead), TEM2011
LB30	23289840	Coil, Peaking, TRF4100AT
LC01	23289834	Coil, Peaking, TRF41R0AT
LC02	23289834	Coil, Peaking, TRF41R0AT
LC03	23238714	Coil, Peaking, TRF4100AJ
LC04	23238714	Coil, Peaking, TRF4100AJ
LC05	23238714	Coil, Peaking, TRF4100AJ
LC06	23238714	Coil, Peaking, TRF4100AJ
LC07	23238714	Coil, Peaking, TRF4100AJ
LC08	23238714	Coil, Peaking, TRF4100AJ
LC20	23103845	Coil, TEM2030AY
LC21	23103845	Coil, TEM2030AY
T400	23224364	Transformer, Focus, TLN2168AH
T401	23224373	Transformer, Horiz, Drive, TLN1100AM
△ T461	23236634	Transformer, Flyback, TFB4164AD
T461D	23236447	Screen, SCREEN4115
△ T862	23217509	Transformer, Converter, TPW3475AD
SEMICONDUCTORS		
Q101	23114458	Transistor, RN1206 (28Z13G)
Q102	23114458	Transistor, RN1206 (28Z13G)
Q104	A6708871	Transistor, 2SC388ATM
Q106	23114458	Transistor, RN1206 (28Z13G)
Q107	A6708871	Transistor, 2SC388ATM
Q130	23314794	Transistor, 2PC1815Y (28Z13G)
Q131	23314794	Transistor, 2PC1815Y
Q132	23314791	Transistor, 2PA1015Y
Q200	A6330059	Transistor, 2SC2482(C)
Q301	23319787	IC, LA7833S
Q301B	70391355	Screw, BITTB3X8 SZN
Q303	23314791	Transistor, 2PA1015Y
Q370	23314791	Transistor, 2PA1015Y
Q371	A6002020	Transistor, RN1202
Q371	A6002020	Transistor, RN1202
Q372	A6002020	Transistor, RN1202
Q402	A6330069	Transistor, 2CS2482 FA-1
Q404	A6873777	Transistor, 2SD2553
Q404C	72471082	Screw, BRDT2W3X10 SZN
Q411	23314794	Transistor, 2PC1815Y
Q412	23314794	Transistor, 2PC1815Y
Q413	23314791	Transistor, 2PA1015Y
Q420	23314141	Transistor, 2SC3852
Q420B	70391355	Screw, BITTB3X8 SZN
Q421	23314794	Transistor, 2PC1815Y
Q422	23314794	Transistor, 2PC1815Y
Q423	23314794	Transistor, 2PC1815Y
Q424	23314794	Transistor, 2PC1815Y
Q430	23314141	Transistor, 2SC3852
Q430B	70391355	Screw, BITTB3X8 SZN
Q432	23314794	Transistor, 2PC1815Y
Q438	23314791	Transistor, 2PA1015Y
Q451	23314794	Transistor, 2PC1815Y
Q460	23314850	Transistor, 2SA1788, E
Q460B	72471082	Screw, BRDT2W3X10 SZN
Q461	23314794	Transistor, 2PC1815Y
Q462	23314794	Transistor, 2PC1815Y
Q470	23314794	Transistor, 2PC1815Y
Q470	A6547250	Transistor, 2SA1320
Q471	23314791	Transistor, 2PA1015Y
Q471	23314794	Transistor, 2PC1815Y

Location No.	Part No.	Description
Q472	23314794	Transistor, 2PC1815Y
Q472	23314794	Transistor, 2PC1815Y
Q473	23314791	Transistor, 2PA1015Y
Q490	23314794	Transistor, 2PC1815Y
Q491	23314794	Transistor, 2PC1815Y
Q501	B01A2479	IC, TB1251CN
Q511	23314794	Transistor, 2PC1815Y
Q512	B0386235	IC, TA1287P
Q516	23314791	Transistor, 2PA1015Y
Q517	23314794	Transistor, 2PC1815Y
Q518	23314794	Transistor, 2PC1815Y
Q601	A6342200	Transistor, 2CS2878-A
Q602	A6342200	Transistor, 2CS2878-A
Q603	A6010040	Transistor, RN2004
Q604	23314791	Transistor, 2PA1015Y
Q608	B0376856	IC, TA8211AH
Q612	23314794	Transistor, 2PC1815Y
Q613	23314794	Transistor, 2PC1815Y
Q618	A6342200	Transistor, 2CS2878-A
Q619	A6342200	Transistor, 2CS2878-A
Q671	A6342200	Transistor, 2CS2878-A
Q673	A6342200	Transistor, 2CS2878-A
Q701	23314791	Transistor, 2PA1015Y
Q705	23314794	Transistor, 2PC1815Y
Q706	23314794	Transistor, 2PC1815Y
Q707	A6734590	Transistor, 2SC752(G)TM-Y
Q709	23314794	Transistor, 2PC1815Y
Q710	23314791	Transistor, 2PA1015Y
Q711	A6550640	Transistor, 2SA1837
Q711B	70391355	Screw, BITTB3X8 SZN
Q712	A6369650	Transistor, 2SC4793
Q712B	70391355	Screw, BITTB3X8 SZN
Q719	23314794	Transistor, 2PC1815Y
Q801B	72471082	Screw, BRDT2W3X10 SZN
Q802	23314141	Transistor, 2SC3852
Q802B	70391355	Screw, BITTB3X8 SZN
Q805	23314794	Transistor, 2PC1815Y
△ Q826	A8643108	Photo Coupler, TLP621(GR-LF
Q827	23319693	IC, SE116N, LF4
Q840	23318299	IC, L78MR05
Q840B	70391355	Screw, BITTB3X8 SZN
Q841	23314794	Transistor, 2PC1815Y
Q842	23314794	Transistor, 2PC1815Y
Q861	23314141	Transistor, 2SC3852
Q861B	70391355	Screw, BITTB3X8 SZN
Q901	A6363200	Transistor, 2CS3619
Q902	23314794	Transistor, 2PC1815Y
Q903	A6363200	Transistor, 2CS3619
Q904	23314794	Transistor, 2PC1815Y
Q905	A6363200	Transistor, 2CS3619
Q906	23314794	Transistor, 2PC1815Y
Q907	A6509140	Transistor, 2SA562TM-Y
Q908	A6321240	Transistor, 2SC2120-Y
Q4200	B01A0156	IC, TA1318N
Q4490	A8641063	Photo Coupler, TLP521-1
Q4491	23314917	Transistor, 2SK2003-01MR
Q4493	23314794	Transistor, 2PC1815Y
QA01	23000703	IC, SAA5563PS/0Z13
QA02	23905666	IC, AT24C1610PC
QA03	A6333346	Transistor, 2SC2655-Y(C)
QA04	23114458	Transistor, RN1206 (28Z13G)
QA05	23314794	Transistor, 2PC1815Y
QB01	23314791	Transistor, 2PA1015Y
QB02	23314794	Transistor, 2PC1815Y

Location No.	Part No.	Description
QB30	23314791	Transistor, 2PA1015Y
QF01	23314794	Transistor, 2PC1815Y
QR02	A6734590	Transistor, 2SC752(G)TM-Y
QR03	23314794	Transistor, 2PC1815Y
QR04	A6002040	Transistor, RN1204
QR05	A6002040	Transistor, RN1204
QV01	B0385655	IC, TA1219N
QV02	23314794	Transistor, 2PC1815Y
QV03	23314791	Transistor, 2PA1015Y
QV04	23314794	Transistor, 2PC1815Y
QV05	A6342200	Transistor, 2CS2878-A
QV06	A6342200	Transistor, 2CS2878-A
QV07	A6010040	Transistor, RN2004
QV08	23314794	Transistor, 2PC1815Y
QV11	23314791	Transistor, 2PA1015Y
D101	23115599	Diode, 1N4148 (28Z13G)
D102	23115636	Diode, 1SS110 (28Z13G)
D110	23115636	Diode, 1SS110 (28Z13G)
D224	23115599	Diode, 1N4148
D240	23115599	Diode, 1N4148
D301	23118479	Diode, BYD33J
D302	23118479	Diode, BYD33J
D303	23316794	Diode, SC570A
D304	23118479	Diode, BYD33J
D308	23118479	Diode, BYD33J
D312	23115599	Diode, 1N4148
D320	23115599	Diode, 1N4148
D327	23316717	Diode, Zener, MTZJ11C
D331	23316674	Diode, Zener, MTZJ6.2A
D336	23316672	Diode, Zener, MTZJ5.6B
D337	23316672	Diode, Zener, MTZJ5.6B
D370	23316658	Diode, Zener, MTZJ3.6A
D371	23115599	Diode, 1N4148
D373	23316690	Diode, Zener, MTZJ10B
D374	23115599	Diode, 1N4148
D377	23118479	Diode, BYD33J
D378	23118479	Diode, BYD33J
D401	23316685	Diode, Zener, MTZJ8.2C
D403	23115599	Diode, 1N4148
D406	23118479	Diode, BYD33J
D421	23316680	Diode, Zener, MTZJ7.5A
D422	23316726	Diode, Zener, MTZJ15C
D431	23316670	Diode, Zener, MTZJ5.1C
D432	23316670	Diode, Zener, MTZJ5.1C
D436	23115599	Diode, 1N4148
D441	23316690	Diode, Zener, MTZJ10B
D460	23118479	Diode, BYD33J
D461	23316803	Diode, FMU-G16S
D461B	70391355	Screw, BITTB3X8 SZN
D463	23115599	Diode, 1N4148
D464	23316718	Diode, Zener, MTZJ12A
D466	23316672	Diode, Zener, MTZJ5.6B
D467	23118479	Diode, BYD33J
D470	23316670	Diode, Zener, MTZJ5.1C
D474	23316719	Diode, Zener, MTZJ12B
D488	23115599	Diode, 1N4148
D490	23115599	Diode, 1N4148
D492	23115599	Diode, 1N4148
D498	23115599	Diode, 1N4148
D498	23316745	Diode, Zener, MTZJ27A
D499	23115599	Diode, 1N4148
D499	23115599	Diode, 1N4148
D603	23115599	Diode, 1N4148
D604	23115599	Diode, 1N4148

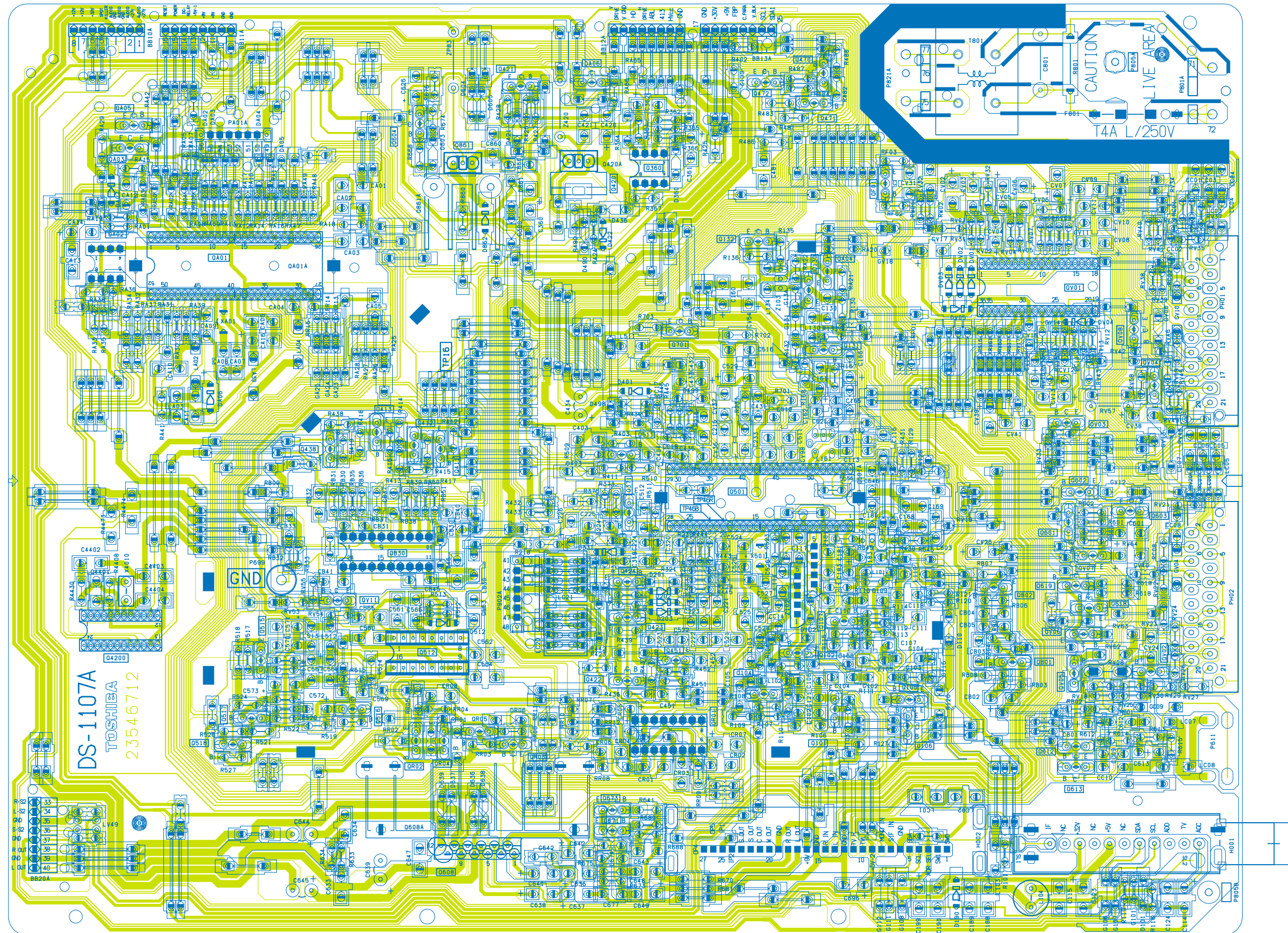
Location No.	Part No.	Description
D605	23115599	Diode, 1N4148
D636	23115599	Diode, 1N4148
D637	23115599	Diode, 1N4148
D638	23115599	Diode, 1N4148
D639	23115599	Diode, 1N4148
D704	23115599	Diode, 1N4148
D705	23115599	Diode, 1N4148
D715	23115599	Diode, 1N4148
D721	23115599	Diode, 1N4148
D801	23357041	Diode, LN6SB60-F05
D804	23316725	Diode, Zener, MTZJ15B
D806	23118479	Diode, BYD33J
D807	23316746	Diode, Zener, MTZJ27B
D810	23316738	Diode, Zener, MTZJ22B
D811	23115599	Diode, 1N4148
D815	23316746	Diode, Zener, MTZJ27B
D817	23115599	Diode, 1N4148
D818	23316738	Diode, Zener, MTZJ22B
D828	23115599	Diode, 1N4148
D842	23316724	Diode, Zener, MTZJ15A
D844	23316715	Diode, Zener, MTZJ11A
D848	23316675	Diode, Zener, MTZJ6.2B
D855	23115599	Diode, 1N4148
D861	23316673	Diode, Zener, MTZJ5.6C
D862	23316674	Diode, Zener, MTZJ6.2A
D883	23118338	Diode, RU-4AM LF-L1
D885	23118094	Diode, EU2A, LF-F10
D892	23118052	Diode, RU4Z LF-L1
D896	23118479	Diode, BYD33J
D901	23115599	Diode, 1N4148
D903	23115599	Diode, 1N4148
D904	23115599	Diode, 1N4148
D905	23115599	Diode, 1N4148
D906	23115599	Diode, 1N4148
D907	23115599	Diode, 1N4148
D908	23115599	Diode, 1N4148
D909	23115599	Diode, 1N4148
D910	23115599	Diode, 1N4148
D911	23115599	Diode, 1N4148
D4410	23115599	Diode, 1N4148
D4411	23115599	Diode, 1N4148
D4412	23115599	Diode, 1N4148
DA02	23115599	Diode, 1N4148
DA03	23115599	Diode, 1N4148
DA04	23115599	Diode, 1N4148
DA05	23115599	Diode, 1N4148
DA06	23118538	Diode, Zener, RD6.2ESA B2
DA07	23316661	Diode, Zener, MTZJ3.9B
DR06	23115599	Diode, 1N4148
DV06	23115599	Diode, 1N4148
MISCELLANEOUS		
B221	23037312	Screw, BTBW 3X12 SZN
BB10B	23903022	Socket, 8P
BB11B	23903022	Socket, 8P
BB12B	23903022	Socket, 8P
BB13B	23903022	Socket, 8P
BB20B	23903022	Socket, 8P
△F470	23144503	Fuse, 1.25A, 250V
F470A	23165433	Holder, Fuse
△F801	23144508	Fuse, 4.0A, 250V
F801A	23165433	Holder, Fuse
△F802	23144506	Fuse, 2.5A, 250V
F802A	23165433	Holder, Fuse

Location No.	Part No.	Description
G101	24366123	CF, 12k ohm (28Z13G)
G103	24366820	CF, 82 ohm
G108	23238562	Coil, Peaking, TRF4109AJ
G111	23238714	Coil, Peaking, TRF4100AJ
G112	23238714	Coil, Peaking, TRF4100AJ
G113	23115636	Diode, 1SS110, TE (28Z13G)
G131	24366221	CF, 220 ohm (28Z13G)
G131	24366271	CF, 270 ohm (28Z13B)
G299	24366103	CF, 10k ohm
G309	23118479	Diode, BYD33J
G312	24366562	CF, 5600 ohm
G337	24366153	CF, 15k ohm
G430	23115532	Diode, ERB12-01E
G465	23316672	Diode, Zener, MTZJ5.6B
GC02	23261959	Coil, Choke, TRF9240
GC03	23261959	Coil, Choke, TRF9240
GC04	23261959	Coil, Choke, TRF9240
GV06	24366101	CF, 100 ohm
GV08	24366101	CF, 100 ohm
GV11	24366101	CF, 100 ohm
GV14	24366101	CF, 100 ohm
GV18	23238714	Coil, Peaking, TRF4100AJ
KB01	23904946	Remote Sensor, RPM-676CBR-S
P661	23363607	Jack, Headphone
△P801	23372052	Power Cord (28Z13G)
△P801	23372151	Power Cord (28Z13B)
PH01	23365598	Connector, 21 Pin
PH02	23365598	Connector, 21 Pin
△S801	23344416	Switch, Power
SA01	23145430	Switch, Push, 1C1P
SA02	23145430	Switch, Push, 1C1P
SA03	23145430	Switch, Push, 1C1P
SA04	23145430	Switch, Push, 1C1P
SA05	23145430	Switch, Push, 1C1P
SA06	23145430	Switch, Push, 1C1P
SR40	23146564	Relay, DC12V
△SR83	23146570	Relay, DC12V
△V901A	23903145	Picture Tube Socket
W661	23351128	Speaker, SPK-1389, 60x120mm, 16 ohm
W662	23351128	Speaker, SPK-1389, 60x120mm, 16 ohm
X4010	23153721	Ceramic Resonator, 503kHz, TCR1023
X501	23153979	Crystal, 4.43MHz
XA01	23153930	Crystal, 12.0MHz
Z102	23303237	Filter, 38MHZ, K9353M (28Z13B)
Z102	23303232	Filter, 38MHZ, K9453M (28Z13G)
Z103	23107926	Ceramic Video Trap, 6.0MHz, TCF1012 (28Z13B)
Z103	23303189	Ceramic Trap, TCF1114 (28Z13G)
Z104	23303072	Ceramic Filter, 6.5MHz, TCF1089
Z420	23144539	Protector, PRF20005491, 125V, 2A
Z891	23144543	Protector, PRF50005491, 125V, 5A
Z898	23144542	Protector, PRF40005491, 125V, 4A
Z902	23103839	Ferrite Core, TFE1012

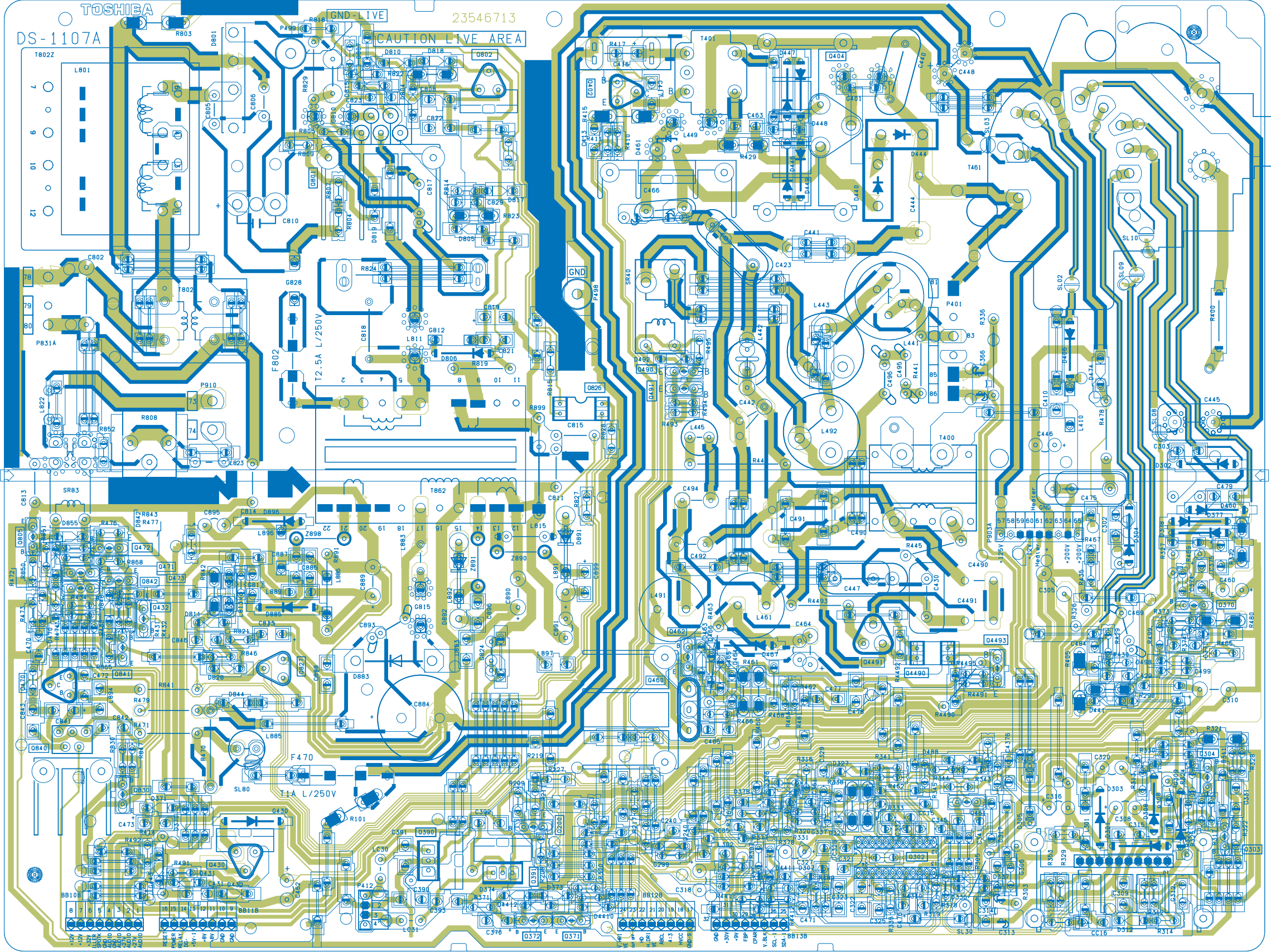
Location No.	Part No.	Description
ZP83	23144536	Protector, PRF10005491, 125V, 1A
PC BOARD ASSEMBLIES		
* U901	23786013	CRT Drive/DSM Board, PD0014A
* U902	23786506	Signal Board, PD0015B
* U903	23786015	Power/DEF Board, PD0016A
* U904A	23786016	CONT-1 Board, PD0017A-1
* U904B	23786017	CONT-2 Board, PD0017A-2
PICTURE TUBE		
△ V901	23312916	Picture Tube, W56QDE891X824
TUNER		
H001	23321413	Tuner, TEDB7-205A (28Z13B)
H001	23321370	Tuner, EGA51L (28Z13G)
ACCESSORIES		
Y101	23565270	Owner's Manual, English, 28Z13B
Y101	23565287	Owner's Manual, English, 28Z13G
Y102	23565288	Owner's Manual, French, 28Z13G
Y103	23565289	Owner's Manual, German, 28Z13G
Y104	23565290	Owner's Manual, Italian, 28Z13G
Y105	23565291	Owner's Manual, Spanish, 28Z13G
CABINET PARTS		
A201	23540645	Front Cover
A214	23035412	Screw, BTB4X12SZN
A215	23035412	Screw, BTB4X12SZN
A231	23445395	Button
A241	70368125	Push Catch for Door
△ A401	23549340	Back Cover
A411	23553139	Label (28Z13B)
A411	23553181	Label (28Z13G)
A501	23030187	Screw, CRT5X30BLUNT

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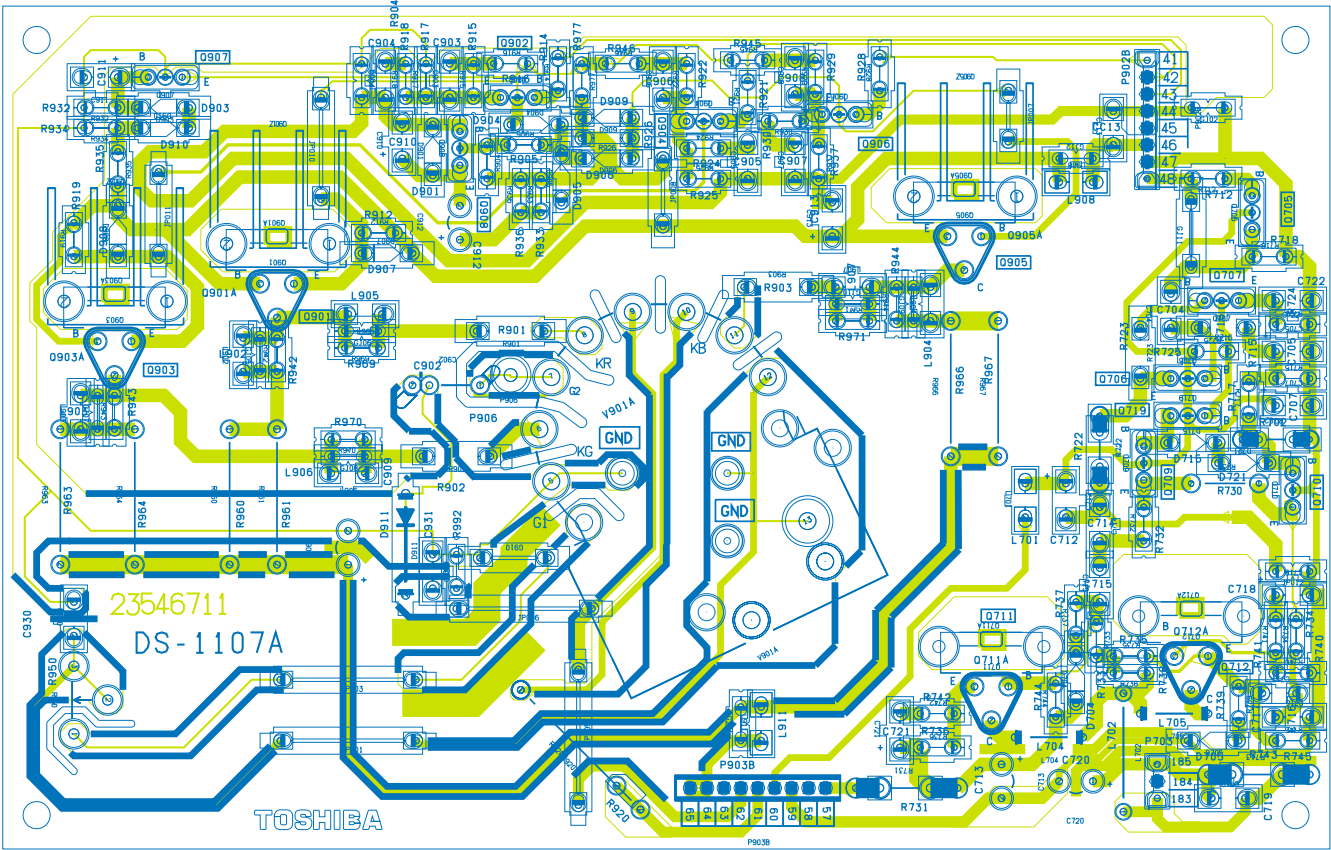
SIGNAL BOARD PD0015
BOTTOM (FOIL) SIDE



POWER/DEF BOARD PD0016
BOTTOM (FOIL) SIDE



CRT-D/DSM BOARD PD0014 BOTTOM (FOIL) SIDE



TERMINAL VIEW OF TRANSISTORS

<p>① 2SD2253 (old) 2SC5243 2SC5570</p>	<p>② 2SC3852 2SD1763A 2SC1569 2SC4544 2SA1788 2SA1306 2SA1186A</p>	<p>③ 2SC752GTM 2SC2482 2SC2655 2SC4721P</p>	<p>④ 2SC752 2SA562TM 2SA1015 2SC1815 2SC2878 2SC1740S 2SC2120 2SA9335</p>	<p>⑤ 2SA1788</p>
<p>⑥ RN2203 RN2201 RN2004 RN1203 RN1204 RN2204 RN1205 RN1202 RN1201</p>	<p>⑦ 2SD1554 2SD2253 2SD1556 2SC5143 2SD2553</p>	<p>⑧ ON4409</p>		

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SPECIFICATIONS (Representative: 28Z13B)

Input Power Rating:	AC 220 ~ 240 Volts				
Aerial Input Impedance:	75 ohm unbalanced type for VHF, UHF and CATV				
Receiving Channels:	System	Channel	VHF	UHF	CATV
	PAL I	UK		21 ~ 69	
	PAL, /60 Hz (For Video Disk play back)				
	4.43 NTSC (For VCR playback), 3.58 NTSC (For VCR playback)				
Intermediate Frequencies:	Picture I-F carrier frequency 38.9 MHz (L VL)				
	Sound I-F carrier frequency 32.9 MHz				
Picture Tube:	28 inches, 660 mm (measured on diagonal of viewable picture area)				
	106° deflection				
Sound Output:	5 W + 5 W (at 10% Distortion, Main)				
Speakers:	60 mm x 120 mm oval, 2 pcs (Main)				
Aux. Terminals:	21 pin socket (FULL), 21 pin socket (S-VIDEO/AV), MONITOR OUTPUT, STEREO HEADPHONE JACK (3.5mm).				
Cabinet:	Table type				
Dimensions:	Height 528 mm				
	Width 828 mm				
	Depth 542 mm				
Mass:	40.0 kg				

* Please refer to owner's manual in detail.

TOSHIBA CORPORATION
1-1, SHIBAURA 1-CHOME, MINATO-KU, TOKYO 105-8001, JAPAN